

SPECIAL PROVISIONS

**FOR CONSTRUCTION ON
STATE HIGHWAY
IN SAN BERNARDINO COUNTY
IN SAN BERNARDINO
ON ROUTE 215 FROM 0.2 km SOUTH of REDLANDS LOOP OVERHEAD
TO 0.7 km NORTH of 16TH STREET OVERCROSSING
ON ROUTE 66 FROM 0.3 km WEST
TO 0.2 km EAST of ROUTE 66/ROUTE 215 SEP
AND ON ROUTE 259 FROM 0.1 km NORTH of BASELINE STREET
OVERCROSSING
TO HIGHLAND AVENUE OVERCROSSING**

Volume III of III

Contract No. C09-196

For Use in Connection with State of California, Department of Transportation Standard Specifications DATED JULY 1999, Standard Plans DATED JULY 2004 and Labor Surcharge And Equipment Rental Rates

San Bernardino Associated Governments
Deborah Barmack Executive Director

Garry Cohoe, P.E Designated Engineer

May 8, 2009

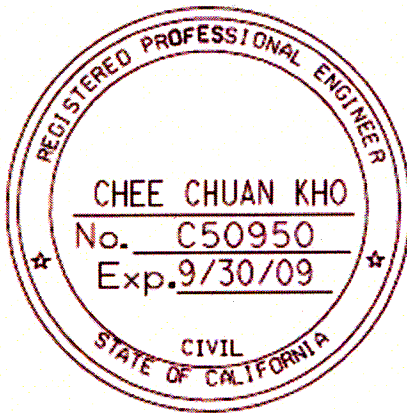
**Federal/Local Projects No.: ESPLN-6053(080) PNRSCML-6053(081)
Federal EA: 08-0071V8L
Local EA: 08-0071V4**

CONTRACT NO. 08-0071V4

DESIGN OVERSIGHT APPROVAL	REGISTRATION NO.	DATE
<i>Dawn M. Ray</i>	C56500	5/15/09

Approval as to impact on State facilities and conformance with applicable State standards and practices as described in the A & E Consultant Services Manual.

The special provisions contained herein have been prepared by or under the direction of the following Registered Persons.

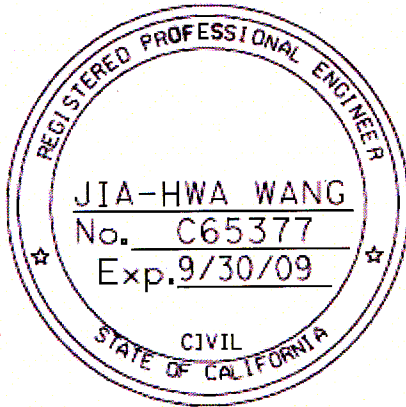


HIGHWAY

Chee Chuan Kho
REGISTERED CIVIL ENGINEER

4-17-09

Date

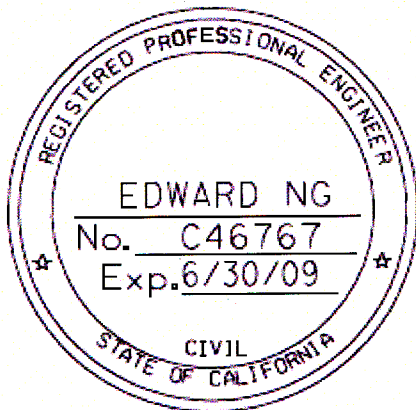


STRUCTURES

Jia-Hwa Wang
REGISTERED CIVIL ENGINEER

4-17-09

Date

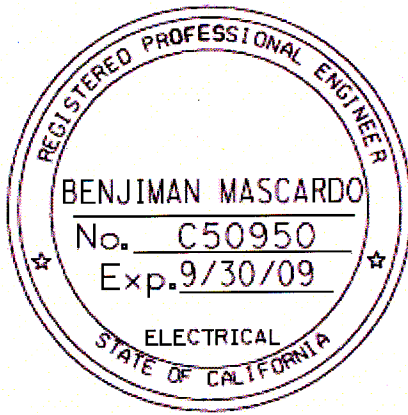


DRAINAGE / SIGNING

Ed Ng
REGISTERED CIVIL ENGINEER

4-17-09

Date

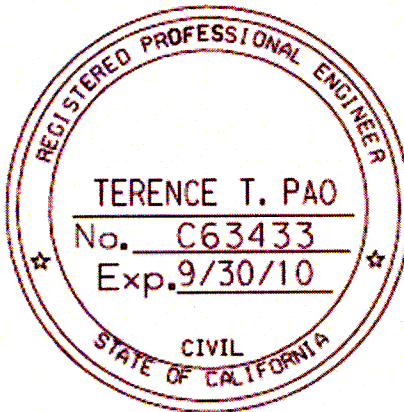


ELECTRICAL

BA Mascardo
REGISTERED CIVIL OR
ELECTRICAL ENGINEER

4-17-09

Date

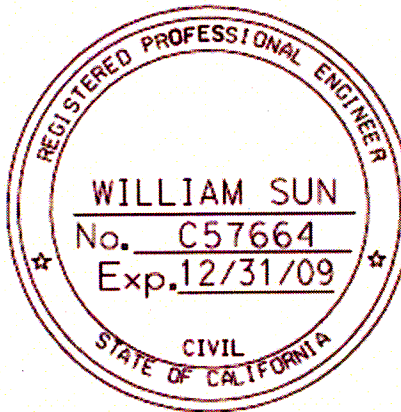


TRAFFIC

Terence T. Pao
REGISTERED CIVIL ENGINEER

4-17-09

Date

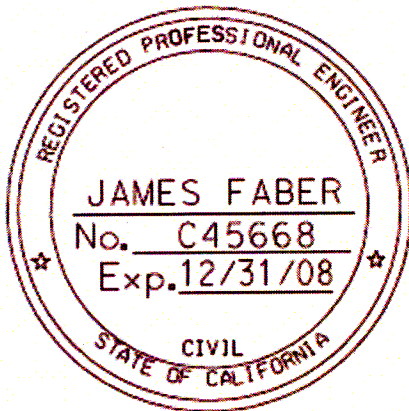


COMMUNICATIONS

William Sun
REGISTERED CIVIL ENGINEER

4-17-09

Date



STAGE CONSTRUCTION

James M. Faber
REGISTERED CIVIL ENGINEER

4-17-09

Date

CONTRACT NO. 08-0071V4

**The special provisions Contained herein
Have been prepared by or under the
direction of the following Licensed Person**



LANDSCAPE

A handwritten signature in dark ink, appearing to read "SHAWN T. BURCH", written over a horizontal line.

REGISTERED LANDSCAPE
ARCHITECT

4-17-09

Date

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SECTION 9. DESCRIPTION OF BRIDGE AND RETAINING WALL WORK

SEGMENT 1

The bridge and retaining wall work of Segment 1 to be done shall consist, in general, of constructing sixteen new retaining walls, six new on-ramp and off-ramp bridges, two bridge replacements, two bridge widenings, one temporary bridge, and one bridge modification as shown on the plans and briefly described as follows:

RETAINING WALL #105E

A mechanically stabilized earth (MSE) wall approximately 90 meters long and with a maximum design height of 9.1 meters.

RETAINING WALL #105W

A cast-in-place reinforced concrete cantilever retaining wall approximately 136 meters long and with a maximum design height of 6.7 meters.

RETAINING WALL #106E

A mechanically stabilized earth (MSE) wall approximately 85 meters long and with a maximum design height of 9.1 meters.

RETAINING WALL #106W

A cast-in-place reinforced concrete cantilever retaining wall approximately 53 meters long and with a maximum design height of 8.5 meters.

RETAINING WALL #107E

A cast-in-place reinforced concrete cantilever retaining wall approximately 119 meters long and with a maximum design height of 7.3 meters.

RETAINING WALL #107W

A mechanically stabilized earth (MSE) wall approximately 80 meters long and with a maximum design height of 8.5 meters.

RETAINING WALL #108E

A cast-in-place reinforced concrete cantilever retaining wall approximately 168 meters long and with a maximum design height of 9.1 meters.

RETAINING WALL #109E

A cast-in-place reinforced concrete cantilever retaining wall approximately 160 meters long and with a maximum design height of 9.7 meters. This wall also includes a special design section of cast-in-place reinforced concrete cantilever retaining wall required for support of a new cantilever sign structure.

RETAINING WALL #109W

A cast-in-place reinforced concrete cantilever retaining wall approximately 161 meters long and with a maximum design height of 8.5 meters.

RETAINING WALL #111E

A mechanically stabilized earth (MSE) wall approximately 65 meters long and with a maximum design height of 9.1 meters.

RETAINING WALL #111W

A cast-in-place reinforced concrete cantilever retaining wall approximately 108 meters long and with a maximum design height of 8.5 meters.

RETAINING WALL #114E

A cast-in-place reinforced concrete cantilever retaining wall approximately 108 meters long and with a maximum design height of 8.5 meters.

RETAINING WALL #115E

A mechanically stabilized earth (MSE) wall approximately 68 meters long and with a maximum design height of 5.5 meters.

RETAINING WALL #116E

A cast-in-place reinforced concrete cantilever retaining wall approximately 190 meters long and with a maximum design height of 8.5 meters.

RETAINING WALL #116W

A mechanically stabilized earth (MSE) wall approximately 262 meters long and with a maximum design height of 6.1 meters.

RETAINING WALL #117W

A retaining wall approximately 173 meters in length consisting of approximately 144 meters of mechanically stabilized earth (MSE) wall and 29 meters of cast-in-place reinforced concrete cantilever retaining wall and with a maximum design height of 8.5 meters. This wall also includes a special design section of cast-in-place reinforced concrete cantilever retaining wall required for support of a new cantilever sign structure.

RIALTO AVENUE UC (WIDEN)

Contract No. 0071V4

Bridge Number 54-0488

An existing single span reinforced concrete box girder bridge with rigid frame abutments. The bridge is to be widened on both sides with cast-in-place reinforced concrete box girders. The bridge measures approximately 27 meters long, and 3.5 meters (Left Widen) wide and 4 meters (& varies) (Right Widen).

REDLANDS LOOP OH (WIDEN)

Bridge Number 54-0489

An existing three span reinforced concrete T-beam bridge. The bridge is to be widened on both sides with precast prestressed concrete girders with a cast-in-place deck. The left widen is approximately 37 meters in length and 12 meter (&varies) in width. The right widen is approximately 35 meters in length and 4 meter (&varies) in width.

REDLANDS LOOP OH
N215 TO 2ND ST OFF-RAMP
Bridge Number 54-1254S

A three span cast-in-place prestressed concrete voided slab bridge, approximately 34 meters in length and 13 meters in width.

RIALTO AVENUE UC
N215 TO 2ND ST OFF-RAMP
Bridge Number 54-1255S

A single span cast-in-place prestressed concrete box girder bridge, approximately 27 meters in length and 12 meters in width.

RIALTO AVENUE UC
S215 TO 2ND ST ON-RAMP
Bridge Number 54-1256K

A single span cast-in-place prestressed concrete box girder bridge, approximately 27 meters in length and 12 meters in width.

SECOND ST UC (REPLACE)
Bridge Number 54-1259

A single span cast-in-place prestressed concrete box girder bridge, approximately 47 meters in length and 58 meters in width to be constructed in three stages.

THIRD ST UC (REPLACE)
Bridge Number 54-1260

A single span cast-in-place prestressed concrete box girder bridge, approximately 42 meters in length and 70 meters in width to be constructed in three stages.

ROUTE 66/I-215 SEP & OH (MODIFY)
Contract No. 0071V4

Bridge Number 54-1250

An existing five span cast-in-place, post-tensioned, reinforced concrete box girder bridge that is approximately 153 meters in length and 39 meters in width. Modifications to this structure include removing K rail and portions of existing chain link railing, and sidewalk, constructing a new curb ramp and sidewalk and various modifications required to tie-in two new ramp bridges to the existing structure.

N215 TO 5TH ST OFF-RAMP Bridge Number 54-1251S

A seven span cast-in-place, post-tensioned, concrete box girder bridge, approximately 205 meters in length and 12 meters in width.

5TH ST TO S215 ON-RAMP Bridge Number 54-1252K

A two frame, ten span cast-in-place, post-tensioned, concrete box girder bridge, approximately 276 meters in length and 12 meters in width.

S215 TO 5TH ST OFF-RAMP Bridge Number 54-1253K

A three span cast-in-place, post-tensioned, concrete box girder bridge, approximately 72 meters in length and 14 meters in width.

SEGMENT 2

The bridge and retaining wall work of Segment 2 to be done shall consist, in general, of constructing twenty-three new retaining walls, two new on-ramp and off-ramp bridges, three bridge replacements, one connector replacement and one new connector as shown on the plans and briefly described as follows:

RETAINING WALL #21L

A cast-in-place reinforced concrete cantilever retaining wall approximately 57 meters long and with a maximum design height of 10.3 meters.

RETAINING WALL #22L

A cast-in-place reinforced concrete cantilever retaining wall approximately 180 meters long and with a maximum design height of 10.9 meters.

RETAINING WALL #22R

A cast-in-place reinforced concrete cantilever retaining wall approximately 191 meters long and with a maximum design height of 9.1 meters. This wall also includes a special design section of cast-in-place reinforced concrete cantilever retaining wall required for support of a new overhead sign structure.

RETAINING WALL #23L

A cast-in-place reinforced concrete cantilever retaining wall approximately 111 meters long and with a maximum design height of 4.8 meters.

RETAINING WALL #23R

A cast-in-place reinforced concrete cantilever retaining wall approximately 136 meters long and with a maximum design height of 4.8 meters.

RETAINING WALL #24L

A cast-in-place reinforced concrete cantilever retaining wall approximately 73 meters long and with a maximum design height of 5.5 meters.

RETAINING WALL #24R

A cast-in-place reinforced concrete cantilever retaining wall approximately 83 meters long and with a maximum design height of 5.5 meters.

RETAINING WALL #126B

A special design cast-in-place reinforced concrete cantilever retaining wall approximately 100 meters long and with a maximum design height of 3.0 meters for support of sound wall on barrier.

RETAINING WALL #127

A cast-in-place reinforced concrete cantilever retaining wall approximately 149 meters long and with a maximum design height of 7.3 meters.

RETAINING WALL #128

A cast-in-place reinforced concrete cantilever retaining wall approximately 220 meters long and with a maximum design height of 9.7 meters.

RETAINING WALL #129

A cast-in-place reinforced concrete cantilever retaining wall approximately 148 meters long and with a maximum design height of 7.3 meters.

RETAINING WALL #131

A cast-in-place reinforced concrete cantilever retaining wall approximately 83 meters long and with a maximum design height of 5.5 meters.

RETAINING WALL #132

Contract No. 0071V4

A cast-in-place reinforced concrete cantilever retaining wall approximately 376 meters long and with a maximum design height of 9.7 meters.

RETAINING WALL #133

A cast-in-place reinforced concrete cantilever retaining wall approximately 232 meters long and with a maximum design height of 10.9 meters.

RETAINING WALL #136

A cast-in-place reinforced concrete cantilever retaining wall approximately 307 meters long and with a maximum design height of 9.1 meters.

RETAINING WALL #137

A special design cast-in-place reinforced concrete cantilever retaining wall approximately 978 meters long and with a maximum design height of 8.5 meters. This wall also includes special design sections of cast-in-place reinforced concrete cantilever retaining wall required for support of new overhead sign structures.

RETAINING WALL #235

A cast-in-place reinforced concrete cantilever retaining wall approximately 171 meters long and with a maximum design height of 9.1 meters.

RETAINING WALL #236

A cast-in-place reinforced concrete cantilever retaining wall approximately 217 meters long and with a maximum design height of 9.1 meters.

RETAINING WALL #237

A cast-in-place reinforced concrete cantilever retaining wall approximately 46 meters long and with a maximum design height of 9.7 meters.

RETAINING WALL #242B

A special design cast-in-place reinforced concrete cantilever retaining wall approximately 585 meters long and with a maximum design height of 4.2 meters for support of sound wall on barrier. This wall also includes a special design section of cast-in-place reinforced concrete cantilever retaining wall required for support of a new overhead sign structure.

RETAINING WALL #334

A cast-in-place reinforced concrete retaining wall approximately 460 meters long and with a maximum design height of 10.3 meters.

RETAINING WALL #335

Contract No. 0071V4

A cast-in-place reinforced concrete cantilever retaining wall approximately 75 meters long and with a maximum design height of 3.6 meters. This wall also includes a special design section of cast-in-place reinforced concrete cantilever retaining wall required for support of a new overhead sign structure.

RETAINING WALL #341

A cast-in-place reinforced concrete cantilever retaining wall approximately 248 meters long and with a maximum design height of 3.6 meters. This wall also includes a special design section of cast-in-place reinforced concrete cantilever retaining wall required for support of a new overhead sign structure.

9TH STREET OC (REPLACE)

Bridge Number 54-1222

A three span cast-in-place, post-tensioned, concrete box girder bridge, approximately 111 meters in length and 22 meters in width.

BASELINE STREET OC (REPLACE)

Bridge Number 54-1223

A three span cast-in-place, post-tensioned, concrete box girder bridge, approximately 115 meters in length and 36 meters (&varies) in width to be constructed in two stages.

SB BASELINE STREET ON-RAMP

Bridge Number 54-1224

A four span cast-in-place, post-tensioned, concrete box girder bridge, approximately 107 meters in length and 12 meters (&varies) in width.

SB BASELINE STREET OFF-RAMP

Bridge Number 54-1225

A four span cast-in-place, post-tensioned, concrete box girder bridge, approximately 107 meters in length and 14 meters (&varies) in width.

S259/S215 CONNECTOR (REPLACE)

Bridge Number 54-1239F

A five span cast-in-place, post-tensioned, concrete box girder bridge, approximately 288 meters in length and 13 meters in width.

N215/N259 CONNECTOR

Bridge Number 54-1240G

A three span cast-in-place, post-tensioned, concrete box girder bridge, approximately 152 meters in length and 13 meters in width.

16TH STREET OC/OH (REPLACE)

Contract No. 0071V4

Bridge Number 54-1241

A six span cast-in-place, post-tensioned, concrete box girder bridge, approximately 206 meters in length and 15 meters in width.

Contract No. 0071V4

SECTION 10. CONSTRUCTION DETAILS

SECTION 10-1. GENERAL

10-1.01 ORDER OF WORK

Order of work shall conform to the provisions in Section 5-1.05, "Order of Work," of the Standard Specifications and these special provisions.

The Contractor is to coordinate with the BNSF Railway Company (BNSF) for work windows during construction of this project, in and adjacent to BNSF rights of way.

Contractor is cautioned that BNSF has placed significant restrictions on the Contractor's work windows and accessibility to areas of the project under BNSF control. Work windows within the fourth quarter of any calendar year will likely be eliminated, for portions of work within BNSF control. Contractor's attention is directed to Section 13 of these Special Provisions which states the conditions necessary to work in BNSF controlled areas or the project.

Specific work windows and schedules in BNSF controlled areas will be determined using the processes stated in Section 13 of these Special Provisions. Work windows and schedules will be determined as mutually agreed to between BNSF and the Contractor so specific durations or work windows do not exist at this time. When requesting work windows, the Contractor is encouraged to provide eight weeks advanced notice to BNSF with its requests in order to achieve the greatest probability of approval by BNSF.

Coordination with BNSF for their work as part of removal of existing facilities in BNSF right of way, as specified in the construction and maintenance agreements, will be required.

In all cases, the Contractor shall fully comply with all requirements contained within Section 13 of these Special Provisions.

Attention is directed to "Bird Protection" of these Special Provisions.

Attention is directed to “Environmental Commitment Record” in Attachment 4 of these Special Provisions for additional constraints and requirements.

Application of erosion control may require several move in/ move outs of erosion control equipment . Attention is directed to the “Move-in/Move-out (Erosion Control)” section of these Special Provisions.

Upon substantial completion of slopes, permanent erosion control shall be placed as soon as practical.

Contractor shall provide temporary lighting at locations where existing lighting are to be disconnected during construction. Contractor shall provide temporary lighting systems at temporary entrance and exit ramps. See Traffic Manual Chapter 9 for typical ramp lighting layout. It is the Contractor’s responsibility to arrange for electrical service connection for all temporary lighting.

Attention is directed to section entitled “Cooperation” of these special provisions. The Contractor shall coordinate and cooperate his operation with state forces, other agency forces, and other contractors that may be performing work within these construction limits and adjacent projects adjoining the construction limits.

Attention is directed to “Maintaining Traffic” and “Temporary Pavement Delineation” of these special provisions and to the traffic handling and detour sheets of the plans.

At locations exposed to public traffic where guard railings or barriers are to be constructed, reconstructed, or removed and replaced, the Contractor shall schedule his operations so that at the end of the each working day there shall be no post holes open nor shall there be any railing or barrier posts installed with out the blocks and rail elements assembled and mounted there on.

Attention is directed to “Architectural Treatment” of these special provisions regarding the construction of a 4 m x 4 m test panels before beginning work on architectural textures.

Attention is directed to “Jacking Superstructure” of these special provisions and to the stage construction sheets of the plans.

Attention is directed to "Contractor furnishing tests and mix proportions for concrete to be used in concrete pavement," "Prepaving Conference," "Just-In-Time Training," and "Test Strip" of these special provisions.

Attention is directed to “Tunnel Safety Orders” and Attachment 5 of these Special Provisions.

Attention is directed to the following restrictions on private property access:

PARCEL #	ADDRESS	AVAILABLE FOR CONSTRUCTION DATE	WORK RESTRICTIONS
*****	SEGMENT 1		
17914	854 W. 8 th St. SB, CA 92410	At Notice To Proceed	Contractor's temporary fence shall not prevent window security bars from opening. Protect in Place-Patio Cover
18564	894 W. 2 nd Street SB, CA 92410	At Notice To Proceed	None
18566	860 W. 2 nd St. and 877 Main St., SB, CA	January 5, 2010	None

	92410		
18798	Vacant Land-KLR	January 5, 2010	None
18801	Cell Site-LA SMSA	January 5, 2010	None
18811	Vacant Land	At Notice To Proceed	None
19604/19614	Games for Fun 895 W. Rialto Ave. & 101 S. "I" St., S.B. 92410	January 5, 2010	Contractor shall not use the TCE between Thanksgiving day and New Years day.
19607	815 W. Rialto Ave., SB, CA 92410	January 5, 2010	The 3m easement shall only be available for use by the contractor for a continuous 12 month period during the first 18 months following contract award. Contractor shall restore the easement area and remove any temporary fencing within the 12 month period.
19618	190 Bungalow Ct, SB, CA 92410	January 2, 2012	Contractor shall ensure that access to all driveways on Bungalow Court is maintained at all times.
19619	797 2 nd St. SB, CA 92408	At Notice To Proceed	Contractor shall ensure that access to all driveways on Bungalow Court is maintained at all times.
19798	606 N. "H" St., S.B.	January 5, 2010	None
20103	133 N. I Street, SB, CA	At Notice To Proceed	Contractor shall maintain access to parking lot behind apartments by keeping driveway open.

PARCEL #	ADDRESS	AVAILABLE FOR CONSTRUCTION DATE	WORK RESTRICTIONS
*****	SEGMENT 2		
17870	1158 N H St, SB, CA 92410	January 5, 2010	U-Store-It-Buildings to be demoed by January 1, 2010 or sooner
17882	840 W. Olive Street SB, CA 92410	At Notice To Proceed	Contractor shall protect in place the house within the TCE area.
17888	848 W. 10 th Street SB, CA	At Notice To Proceed	Contractor shall protect in place the house within the TCE area.
17925	1200 N. "H" St., S.B.	August 30, 2009	Firestation/maint. bldg. @ Baseline/H
17926/17929	1228 N H St., SB, CA 92405	January 5, 2010	"H" St. Collision & Cell Site
19161	1400 N H St., SB, CA 92405	January 5, 2010	Building to be demoed by January
19164/20570	1598 N. "H" Street SB, CA 92405	At Notice To Proceed	Contractor shall protect in place the private fire hydrant within the TCE area.
19177	1328 N H St., SB, CA 92405	January 5, 2010	Aratex Services, Inc.-Building to be demoed by January 1, 2010
19179	799 W. Baseline SB, CA	At Notice To Proceed	Contractor shall ensure that one driveway on H Street and one driveway on Baseline Street remain open at all times.
19182	794 W. Baseline SB, CA	At Notice To Proceed	Contractor shall ensure that one driveway on H Street and one driveway on Baseline Street remain open at all times. Maintaining half of

			the driveway width is acceptable.
19184	SB Unified School Dist.	At Notice To Proceed	Contractor shall provide 30 day advance, written, notice to Engineer, before entry onto TCE. Contractor shall protect in place mature evergreen tree in TCE area.
19185	1344 N. "H" St., S.B.	January 5, 2010	Building to be demoed by January
20569	815 W. Virginia SB, CA	At Notice To Proceed	Contractor to protect in place fencing and irrigation system
20571	1602-1610 N. H Street SB, CA 92405	At Notice To Proceed	Contractor to protect in place mailboxes along H Street.
20574	970, 976, 980 & 1010 W. Baseline St., S.B.	At Notice To Proceed	Contractor to protect in place palm trees and any major improvements.
20575	1024 W. Baseline SB, CA 92411	At Notice To Proceed	Contractor shall protect in place all improvements within the TCE area.
20577	995 W. Baseline St., S.B.	January 5, 2010	Rim Press-Buildings to be demoed by January 2010

Attention is directed to "Slope Paving" of these special provisions regarding constructing a 1.2 m by 1.8 m test panel prior to placing the permanent slope paving.

Attention is directed to "Jointed Plain Concrete Pavement" of these special provisions regarding furnishing tests and mix proportions for concrete to be used in concrete pavement, prepaving conference, Just-In-Time Training, and Test Strip.

Temporary railing (Type K) and temporary crash cushions shall be secured in place prior to commencing work for which the temporary railing and crash cushions are required.

Attention is directed to "Water Pollution Control" of these special provisions regarding the submittal and approval of the Storm Water Pollution Prevention Plan (SWPPP) prior to performing work having potential to cause water pollution.

The first order of work shall be to place the order for the electrical equipment and signs. The uppermost layer of new pavement shall not be placed until all underlying conduits and loop detectors have been installed.

Prior to commencement of the traffic signal functional test at any location, all items of work related to signal control shall be completed and all roadside signs, pavement delineation, and pavement markings shall be in place at that location.

Attention is directed to "Maintaining Traffic" and "Temporary Pavement Delineation" of these special provisions and to the stage construction sheets of the plans.

Attention is directed to "Progress Schedule (Critical Path Method)" of these special provisions regarding the submittal of a general time-scaled logic diagram within 10 days after approval of the contract. The diagram shall be submitted prior to performing any work that may be affected by any proposed deviations to the construction staging of the project.

The work shall be performed in conformance with the stages of construction shown on the plans. Nonconflicting work in subsequent stages may proceed concurrently with work in preceding stages, provided satisfactory progress is maintained in the preceding stages of construction.

In each stage, after completion of the preceding stage, the first order of work shall be the removal of existing pavement delineation as directed by the Engineer. Pavement delineation

removal shall be coordinated with new delineation so that lane lines are provided at all times on traveled ways open to public traffic.

Before obliterating any pavement delineation (traffic stripes, pavement markings, and pavement markers) that is to be replaced on the same alignment and location, as determined by the Engineer, the pavement delineation shall be referenced by the Contractor, with a sufficient number of control points to reestablish the alignment and location of the new pavement delineation. The references shall include the limits or changes in striping pattern, including one- and 2-way barrier lines, limit lines, crosswalks and other pavement markings. Full compensation for referencing existing pavement delineation shall be considered as included in the contract prices paid for new pavement delineation and no additional compensation will be allowed therefor.

Prior to applying hot mix asphalt, the Contractor shall cover all manholes, valve and monument covers, grates, or other exposed facilities located within the area of application, using a plastic or oil resistant construction paper secured to the facility being covered by tape or adhesive. The covered facilities shall be referenced by the Contractor, with a sufficient number of control points to relocate the facilities after the hot mix asphalt has been placed. After completion of the hot mix asphalt operation, all covers shall be removed and disposed of in a manner satisfactory to the Engineer. Full compensation for covering manholes, valve and monument covers, grates, or other exposed facilities, referencing, and removing temporary cover shall be considered as included in the contract price paid per tonne for hot mix asphalt, and no additional compensation will be allowed therefor.

At those locations exposed to public traffic where guard railings or barriers are to be constructed, reconstructed, or removed and replaced, the Contractor shall schedule operations so that at the end of each working day there shall be no post holes open nor shall there be any railing or barrier posts installed without the blocks and rail elements assembled and mounted thereon.

At least 60 days before applying seeds, furnish the Engineer a statement from the vendor that the order for the seed required for this contract has been received and accepted by the vendor. The statement from the vendor must include the names and quantity of seed ordered and the anticipated date of delivery.

The Engineer designates ground locations of erosion control by directing the placing of stakes or other suitable markers before application of erosion control materials as specified under "Erosion Control (Type D)," of these special provisions.

Unless otherwise shown on the plans or specified in these special provisions, conduits to be jacked or drilled or installed by the open trench method for water line crossovers and sprinkler control crossovers must be installed before the installation of other pipe supply lines.

When embankment settlement periods or surcharge embankment settlement periods are specified, the settlement periods and the deferment of portions of the work shall comply with the provisions in Section 19-6.025, "Settlement Period," of the Standard Specifications and in "Earthwork" of these special provisions.

10-1.02 WATER POLLUTION CONTROL

GENERAL

Water pollution control work shall conform to the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications, section of these special provisions entitled "Relations With California Regional Water Quality Control Board," and these special provisions.

The Contractor may obtain other National Pollutant Discharge Elimination System (NPDES) permits that apply to activities and mobile operations within or outside of the project limits including hot mix asphalt batch plants, material borrow areas, concrete plants, staging areas, storage yards, or access roads.

The Contractor shall perform water pollution control work in conformance with the requirements in the "Storm Water Pollution Prevention Plan (SWPPP) and Water Pollution Control Program (WPCP) Preparation Manual" and its addenda in effect on the day the Notice to Contractors is dated. This manual is referred to as the "Preparation Manual." Copies of the Preparation Manual may be obtained from:

State of California
Department of Transportation
Publication Distribution Unit
1900 Royal Oaks Drive
Sacramento, California 95815
Telephone: (916) 445-3520

The Preparation Manual and other references for performing water pollution control work are available from the Department's Construction Storm Water and Water Pollution Control web site at:

<http://www.dot.ca.gov/hq/construc/stormwater/stormwater1.htm>

Before the start of job site activities, the Contractor shall provide training for project managers, supervisory personnel, and employees involved with water pollution control work. The training shall include:

- A. Rules and regulations
- B. Implementation and maintenance for:
 - 1. Temporary Soil Stabilization
 - 2. Temporary Sediment Control
 - 3. Tracking Control
 - 4. Wind Erosion Control

The Contractor shall designate in writing a Water Pollution Control Manager (WPCM). The Contractor shall submit a statement of qualifications describing the training, work history, and expertise of the proposed WPCM. The qualifications shall include either:

- A. A minimum of 24 hours of Department approved storm water management training described at Department's Construction Storm Water and Water Pollution Control web site.
- B. Certification as a Certified Professional in Erosion and Sediment Control (CPESC).

The WPCM shall be:

- A. Responsible for water pollution control work.
- B. The primary contact for water pollution control work.
- C. Have authority to mobilize crews to make immediate repairs to water pollution control practices.

The Contractor may designate one manager to prepare the SWPPP and a different manager to implement the plan. The WPCP preparer shall meet the training requirements for the WPCM.

STORM WATER POLLUTION PREVENTION PLAN

The Contractor shall submit a Storm Water Pollution Prevention Plan (SWPPP) to the Engineer for approval. The SWPPP shall conform to the requirements in the Preparation Manual, the NPDES permit, and these special provisions. The SWPPP shall be submitted in place of the water pollution control program required by the provisions in Section 7-1.01G, "Water Pollution," of the Standard Specifications.

The SWPPP shall include water pollution control practices:

- A. For storm water and non-storm water from areas outside of the job site related to construction activities for this contract such as:
 - 1. Staging areas.
 - 2. Storage yards.
 - 3. Access roads.
- B. Appropriate for each season as described in "Implementation Requirements" of these special provisions.
- C. For activities or mobile operations related to all NPDES permits.

The SWPPP shall include a schedule that:

- A. Describes when work activities that could cause water pollution will be performed.
- B. Identifies soil stabilization and sediment control practices for disturbed soil area.
- C. Includes dates when these practices will be 25, 50, and 100 percent complete.
- D. Shows 100 percent completion of these practices before the rainy season.

The SWPPP shall include the following temporary water pollution control practices and their associated contract items of work as shown on the plans or specified in these special provisions:

A. Temporary Soil Stabilization

- 1. Temporary Soil Binder
- 2. Temporary Cover

B. Temporary Sediment Control

- 1. Temporary Fiber Roll

2. Temporary Silt Fence
 3. Temporary Drainage Inlet Protection
 4. Temporary Gravel Bag Berm
- C. Tracking Control
1. Temporary Construction Entrance
 2. Street Sweeping
- D. Wind Erosion Control
- E. Non-Storm Water Management
1. Construction Site Management
- F. Waste Management and Materials Pollution Control
1. Temporary Concrete Washout Facility
 2. Temporary Concrete Washout (Bin)
 3. Construction Site Management

The SWPPP shall include the following contract items of work for permanent water pollution control as shown on the plans or as specified in these special provisions:

- A. Erosion Control (Type D)
- B. Slope Paving
- C. Biofiltration Swale
- D. Erosion Control (Blanket)
- E. Rock Blanket

Within 20 days after contract approval, the Contractor shall submit 3 copies of the SWPPP to the Engineer. The Contractor shall allow 20 days for the Engineer's review. If revisions are required, the Engineer will provide comments and specify the date that the review stopped. The Contractor shall revise and resubmit the SWPPP within 15 days of receipt of the Engineer's comments. The Engineer's review will resume when the complete SWPPP is resubmitted. When the Engineer approves the SWPPP, the Contractor shall submit 4 copies of the approved SWPPP to the Engineer. The Contractor may proceed with construction activities if the Engineer conditionally approves the SWPPP while minor revisions are being completed. If the Engineer fails to complete the review within the time allowed and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay, the Contractor will be compensated for resulting losses, and an extension of time will be granted, as provided for in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The SWPPP shall include a copy of the RWQCB Waste Discharge Requirements for Aerially Deposited Lead Reuse.

The Contractor shall not perform work that may cause water pollution until the SWPPP has been approved by the Engineer. The Engineer's review and approval shall not waive any contract requirements and shall not relieve the Contractor from complying with Federal, State and local laws, regulations, and requirements.

The Contractor shall amend the SWPPP annually and shall resubmit it to the Engineer 25 days before the defined rainy season.

If there is a change in construction schedule or activities, the Contractor shall prepare an amendment to the SWPPP to identify additional or revised water pollution control practices. The Contractor shall submit the amendment to the Engineer for review within a time agreed to by the Engineer not to exceed the number of days specified for the initial submittal of the SWPPP. The Engineer will review the amendment within the same time allotted for the review of the initial submittal of the SWPPP.

If directed by the Engineer or requested in writing by the Contractor and approved by the Engineer, changes to the water pollution control work specified in these special provisions will be allowed. Changes may include addition of new water pollution control practices. The Contractor shall incorporate these changes in the SWPPP. Additional water pollution control work will be paid for as extra work in accordance with Section 4-1.03D, "Extra Work," of the Standard Specifications.

The Contractor shall keep a copy of the approved SWPPP at the job site. The SWPPP shall be made available when requested by a representative of the Regional Water Quality Control Board, State Water Resources Control Board, United States Environmental Protection Agency, or the local storm water management agency. Requests from the public shall be directed to the Engineer.

SAMPLING AND ANALYSIS

The Contractor shall include a Sampling and Analysis Plan (SAP) in the SWPPP to monitor the effectiveness of the water pollution control practices. The Contractor shall prepare the SAP in conformance with the Preparation Manual.

The Contractor shall designate trained personnel to collect water quality samples. The personnel and training shall be documented in the SAP. Training shall consist of the following elements:

- A. SAP review,
- B. Health and safety review, and
- C. Sampling simulations.

In the SAP the Contractor shall describe the following water quality sampling procedures:

- A. Sampling preparation,
- B. Collection,
- C. Quality assurance and quality control,
- D. Sample labeling,
- E. Collection documentation,
- F. Sample shipping,
- G. Chain of custody,
- H. Sample numbering, and
- I. Precautions from the construction site health and safety plan.

The Contractor shall document sample collection during precipitation.

Samples to be analyzed in the field shall be taken by the Contractor's designated sampling personnel using collection and analysis methods, and equipment calibration specified by the manufacturer of the sampling equipment. Samples to be analyzed by a laboratory, shall be sampled, preserved, and analyzed by a State-certified laboratory in conformance with the requirements in 40 CFR Part 136, "Guidelines Establishing Test Procedures for the Analysis of

Pollutants." The Contractor shall identify the State-certified laboratory, sample containers, preservation requirements, holding times, and analysis method in the SAP. A list of State-certified laboratories that are approved by the Department is available at:

<http://www.dhs.ca.gov/ps/ls/ELAP/html/lablist.htm>

Non-Visible Pollutants

This project has the potential to discharge non-visible pollutants in storm water from the construction site. The Contractor shall include in the SAP a description of the sampling and analysis strategy to be implemented on the project for monitoring non-visible pollutants.

In the SAP the Contractor shall identify potential non-visible pollutants that will be present on the construction site associated with the following:

- A. Construction materials and wastes;
- B. Existing contamination due to historical site usage; or
- C. Application of soil amendments, including soil stabilization products, with the potential to alter pH or contribute toxic pollutants to storm water.

The Contractor shall show the locations planned for storage and use of the potential non-visible pollutants on the SWPPP Water Pollution Control Drawings.

The Contractor shall include in the SAP the following list of conditions that require sampling when observed during a storm water inspection:

- A. Materials or wastes containing potential non-visible pollutants are not stored under watertight conditions.
- B. Materials or wastes containing potential non-visible pollutants are stored under watertight conditions, but:
 - 1. A breach, leakage, malfunction, or spill is observed;
 - 2. The leak or spill has not been cleaned up before precipitation; and
 - 3. There is the potential for discharge of non-visible pollutants to surface waters or drainage system.
- C. Construction activities; such as application of fertilizer, pesticide, herbicide, methyl methacrylate concrete sealant, or non-pigmented curing compound; have occurred during precipitation or within 24 hours preceding precipitation, and have the potential to discharge pollutants to surface waters or drainage system.
- D. Soil amendments, including soil stabilization products, with the potential to alter pH levels or contribute toxic pollutants to storm water runoff have been applied, and have the potential to discharge pollutants to surface waters or drainage system (unless independent test data are available that demonstrate acceptable concentrations of non-visible pollutants in the soil amendment).
- E. Storm water runoff from an area contaminated by historical usage of the site has the potential to discharge pollutants to surface waters or drainage system.

The Contractor shall describe in the SAP the schedule for collecting a sample downhill from each non-visible pollutant source and an uncontaminated control sample, during the first 2 hours

of discharge from precipitation during daylight hours that result in enough discharge for sample collection. If discharge flows to the non-visible pollutant source, a sample shall be collected immediately downhill from where the discharge enters the Department's right of way. If precipitation occurs again after at least 72 hours of dry weather the Contractor shall take new samples.

In the SAP the Contractor shall identify sampling locations for collecting downstream and control samples, and the reason for their selection. The control sampling location shall be selected so the sample does not come into contact with materials, wastes or areas associated with potential non-visible pollutants or disturbed soil areas. The Contractor shall show non-visible pollutant sampling locations on the SWPPP Water Pollution Control Drawings.

The Contractor shall identify in the SAP the analytical method to be used for downhill and control samples for potential non-visible pollutants on the project.

Analytical Results and Evaluation

The Contractor shall submit a hard copy and electronic copy of water quality analytical results, and quality assurance and quality control data to the Engineer within 5 days of sampling for field analyses, and within 30 days for laboratory analyses. The Contractor shall also provide an evaluation of whether the downhill samples show levels of the tested parameter higher than in the control sample. If downhill or downstream samples show increased levels, the Contractor will assess the water pollution control measures, site conditions, and surrounding influences to determine the probable cause for the increase. As determined by the assessment, the Contractor will repair or modify water pollution control measures to address increases and amend the SWPPP as necessary. Electronic results (in one of the following file formats: .xls, .txt, .csv, .dbs, or .mdb) shall have the following information:

- A. Sample identification number.
- B. Contract number.
- C. Constituent.
- D. Reported value.
- E. Analytical method.
- F. Method detection limit.
- G. Reported limit.

The Contractor shall maintain the water quality sampling documentation and analytical results with the SWPPP on the project site.

If construction activities or knowledge of site conditions change such that discharges or sampling locations change, the Contractor shall amend the SAP in conformance with this section, "Water Pollution Control."

IMPLEMENTATION REQUIREMENTS

The Contractor's responsibility for SWPPP implementation shall continue throughout any temporary suspension of work ordered in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications.

If the Contractor or the Engineer identifies a deficiency in the implementation of the approved SWPPP, the deficiency shall be corrected immediately, unless an agreed date for correction is approved in writing by the Engineer. The deficiency shall be corrected before the onset of precipitation. If the Contractor fails to correct the deficiency by the agreed date or

before the onset of precipitation, the Department may correct the deficiency and deduct the cost of correcting deficiencies from payments.

If the Contractor fails to conform to the provisions of this section, "Water Pollution Control," the Engineer may order the suspension of work until the project complies with the requirements of this section.

The Contractor shall construct permanent water pollution control items identified in the SWPPP as specified in "Order of Work" of these special provisions. The Contractor shall maintain the permanent water pollution control items in the locations and condition shown on the plans throughout the duration of the project.

Year-Round

The Contractor shall monitor the National Weather Service weather forecast on a daily basis during the contract. The Contractor may use an alternative weather forecasting service if approved by the Engineer. Appropriate water pollution control practices shall be in place before precipitation.

The Contractor may discontinue earthwork operations for a disturbed area for up to 21 days and the disturbed soil area will still be considered active. When earthwork operations in the disturbed area have been completed, the Contractor shall implement appropriate water pollution control practices within 15 days, or before predicted precipitation, whichever occurs first.

The Contractor shall provide soil stabilization and sediment control practices during the rainy season between October 1 and May 1.

The Contractor shall implement soil stabilization and sediment control practices a minimum of 10 days before the start of the rainy season.

During the defined rainy season, the active disturbed soil area of the project site shall be not more than 2 hectares. The Engineer may approve expansions of the active disturbed soil area limit if requested in writing. The Contractor shall maintain soil stabilization and sediment control materials on site to protect disturbed soil areas.

INSPECTION AND MAINTENANCE

The WPCM shall inspect the water pollution control practices identified in the SWPPP as follows:

- A. Before a forecasted storm,
- B. After precipitation that causes site runoff,
- C. At 24-hour intervals during extended precipitation,
- D. On a predetermined schedule, a minimum of once every 2 weeks outside of the defined rainy season, and
- E. On a predetermined schedule, a minimum of once a week during the defined rainy season.

The WPCM shall oversee the maintenance of the water pollution control practices.

The WPCM shall use the Storm Water Quality Construction Site Inspection Checklist provided in the Preparation Manual or an alternative inspection checklist provided by the Engineer. A copy of the completed site inspection checklist shall be submitted to the Engineer within 24 hours of finishing the inspection.

REPORTING REQUIREMENTS

If the Contractor identifies discharges into surface waters or drainage systems causing or potentially causing pollution, or if the project receives a written notice or order from a regulatory agency, the Contractor shall immediately inform the Engineer. The Contractor shall submit a written report to the Engineer within 7 days of the discharge, notice or order. The report shall include the following information:

- A. The date, time, location, and nature of the operation, type of discharge and quantity, and the cause of the notice or order.
- B. The water pollution control practices used before the discharge, or before receiving the notice or order.
- C. The date of placement and type of additional or altered water pollution control practices placed after the discharge, or after receiving the notice or order.
- D. A maintenance schedule for affected water pollution control practices.

Annual Certifications

By June 15 of each year, the Contractor shall complete and submit to the Engineer an Annual Certification of Compliance, as contained in the Preparation Manual.

PAYMENT

During each estimate period the Contractor fails to conform to the provisions in this section, "Water Pollution Control," or fails to implement the water pollution control practices shown on the plans or specified elsewhere in these special provisions as items of work, the Department will withhold 25 percent of the progress payment.

Withholds for failure to perform water pollution control work will be in addition to all other withholds provided for in the contract. The Department will return performance-failure withholds in the progress payment following the correction of noncompliance.

The contract lump sum price paid for prepare storm water pollution prevention plan shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparing, obtaining approval of, and amending the SWPPP and inspecting water pollution control practices as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Payments for prepare storm water pollution prevention plan will be made as follows:

- A. After the SWPPP has been approved by the Engineer, 50 percent of the contract item price for prepare storm water pollution prevention plan will be included in the monthly progress estimate.
- B. Forty percent of the contract item price for prepare storm water pollution prevention plan will be paid over the life of the contract.
- C. After acceptance of the contract in conformance with the provisions in Section 7-1.17, "Acceptance of Contract," of the Standard Specifications, payment for the remaining 10 percent of the contract item price for prepare storm water pollution prevention plan will be made in conformance with the provisions in Section 9-1.07A, "Payment Prior to Proposed Final Estimate."

Storm water sampling and analysis will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications. No payment will be made for the preparation, collection, analysis, and reporting of storm water samples where appropriate water pollution control practices are not implemented before precipitation or if a failure of a water pollution control practice is not corrected before precipitation.

Implementation of water pollution control practices in areas outside the highway right of way not specifically provided for in the SWPPP or in these special provisions will not be paid for.

Water pollution control practices for which there are separate contract items of work will be measured and paid for as those contract items of work.

10-1.03 CONSTRUCTION SITE MANAGEMENT

Construction site management shall consist of controlling potential sources of water pollution before they come in contact with storm water systems or watercourses. The Contractor shall control material pollution and manage waste and non-storm water existing at the construction site by implementing effective handling, storage, use, and disposal practices.

Attention is directed to "Water Pollution Control" of these special provisions regarding the Contractor's appointment of a water pollution control manager (WPCM) for the project.

The Contractor shall train all employees and subcontractors regarding:

- A. Material pollution prevention and control;
- B. Waste management;
- C. Non-storm water management;
- D. Identifying and handling hazardous substances; and
- E. Potential dangers to humans and the environment from spills and leaks or exposure to toxic or hazardous substances.

Training shall take place before starting work on this project. New employees shall receive the complete training before starting work on this project. The Contractor shall have regular meetings to discuss and reinforce spill prevention and control; material delivery, storage, use, and disposal; waste management; and non-storm water management procedures.

Instructions for material and waste handling, storage, and spill reporting and cleanup shall be posted at all times in an open, conspicuous, and accessible location at the construction site.

Nonhazardous construction site waste and excess material shall be recycled when practical or disposed of in accordance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, unless otherwise specified.

Vehicles and equipment at the construction site shall be inspected by the WPCM on a frequent, predetermined schedule, and by the operator each day of use. Leaks shall be repaired immediately, or the vehicle or equipment shall be removed from the construction site.

SPILL PREVENTION AND CONTROL

The Contractor shall implement spill and leak prevention procedures when chemicals or hazardous substances are stored. Spills of petroleum products; substances listed under CFR Title 40, Parts 110, 117, and 302; and sanitary and septic waste shall be contained and cleaned up as soon as is safe.

Minor spills involve small quantities of oil, gasoline, paint, or other material that can be controlled by the first responder upon discovery of the spill. Cleanup of minor spills includes:

- A. Containing the spread of the spill,
- B. Recovering the spilled material using absorption,
- C. Cleaning the contaminated area, and
- D. Disposing of contaminated material promptly and properly.

Semi-significant spills are those that can be controlled by the first responder with the help of other personnel. Cleanup of semi-significant spills shall be immediate. Cleanup of semi-significant spills includes:

- A. Containing the spread of the spill;
- B. Recovering the spilled material using absorption if the spill occurs on paved or an impermeable surface;
- C. Containing the spill with an earthen dike and digging up contaminated soil for disposal if the spill occurs on dirt;
- D. Covering the spill with plastic or other material to prevent contaminating runoff if the spill occurs during precipitation; and
- E. Disposing of contaminated material promptly and properly.

Significant or hazardous spills are those that cannot be controlled by construction personnel. Notifications of these spills shall be immediate. The following steps shall be taken:

- A. Construction personnel shall not attempt to cleanup the spill until qualified staff have arrived;
- B. Notify the Engineer and follow up with a written report;
- C. Obtain the services of a spills contractor or hazardous material team immediately;
- D. Notify the local emergency response team by dialing 911 and county officials at the emergency phone numbers kept on the construction site;
- E. Notify the Governor's Office of Emergency Services Warning Center at (805) 852-7550;
- F. Notify the National Response Center at (800) 424-8802 regarding spills of Federal reportable quantities in conformance with CFR Title 40, Parts 110, 119, and 302;
- G. Notify other agencies as appropriate, including:
 - 1. Fire Department,
 - 2. Public Works Department,
 - 3. Coast Guard,
 - 4. Highway Patrol,
 - 5. City Police or County Sheriff Department,
 - 6. Department of Toxic Substances,
 - 7. California Division of Oil and Gas,
 - 8. Cal OSHA, or
 - 9. Regional Water Resources Control Board.

The WPCM shall oversee and enforce proper spill prevention and control measures. Minor, semi-significant, and significant spills shall be reported to the Contractor's WPCM who shall notify the Engineer immediately.

The Contractor shall prevent spills from entering storm water runoff before and during cleanup. Spills shall not be buried or washed with water.

The Contractor shall keep material or waste storage areas clean, well organized, and equipped with enough cleanup supplies for the material being stored. Plastic shall be placed under paving equipment when not in use to catch drips.

MATERIAL MANAGEMENT

Material shall be delivered, used, and stored for this contract in a manner that minimizes or eliminates discharge of material into the air, storm drain systems, or watercourses.

The Contractor shall implement the practices described in this section when taking delivery of, using, or storing the following materials:

A. Hazardous chemicals including:

1. Acids,
2. Lime,
3. Glues,
4. Adhesives,
5. Paints,
6. Solvents, and
7. Curing compounds;

B. Soil stabilizers and binders;

C. Fertilizers;

D. Detergents;

E. Plaster;

F. Petroleum products including:

1. Fuel,
2. Oil, and
3. Grease;

G. Asphalt components and concrete components; and

H. Pesticides and herbicides.

The Contractor shall supply the Material Safety Data Sheet to the Engineer for material used or stored. The Contractor shall keep an accurate inventory of material delivered and stored at the construction site.

Employees trained in emergency spill cleanup procedures shall be present when hazardous materials or chemicals are unloaded.

The Contractor shall use recycled or less hazardous products when practical.

Material Storage

The Contractor shall store liquids, petroleum products, and substances listed in CFR Title 40, Parts 110, 117, and 302 in containers or drums approved by the United States Environmental Protection Agency, and place them in secondary containment facilities.

Secondary containment facilities shall be impervious to the materials stored there for a minimum contact time of 72 hours.

Throughout the rainy season secondary containment facilities shall be covered during non-working days and when precipitation is predicted. Secondary containment facilities shall be adequately ventilated.

The Contractor shall keep the secondary containment facility free of accumulated rainwater or spills. After precipitation, or in the event of spills or leaks, accumulated liquid shall be collected and placed into drums within 24 hours. These liquids shall be handled as hazardous waste in accordance with the provisions in "Hazardous Waste" of these special provisions, unless testing determines them to be nonhazardous.

Incompatible materials, such as chlorine and ammonia, shall not be stored in the same secondary containment facility.

Materials shall be stored in the original containers with the original product labels maintained in legible condition. Damaged or illegible labels shall be replaced immediately.

The secondary containment facility shall have the capacity to contain precipitation from a 24-hour-long, 25-year storm; and 10 percent of the aggregate volume of all containers, or all of the volume of the largest container within the facility, whichever is greater.

The Contractor shall store bagged or boxed material on pallets. Throughout the rainy season, bagged or boxed material shall be protected from wind and rain during non-working days and when precipitation is predicted.

The Contractor shall provide sufficient separation between stored containers to allow for spill cleanup or emergency response access. Storage areas shall be kept clean, well organized, and equipped with cleanup supplies appropriate for the materials being stored.

The Contractor shall repair or replace perimeter controls, containment structures, covers, and liners as needed. Storage areas shall be inspected before and after precipitation, and at least weekly during other times.

Stockpile Management

The Contractor shall reduce or eliminate potential air and water pollution from stockpiled material including soil, paving material, or pressure treated wood. Stockpiles shall be located out of floodplains when possible, and at least 15 m from concentrated flows of storm water, drainage courses, or inlets unless written approval is obtained from the Engineer.

The Contractor may discontinue adding or removing material for up to 21 days and a stockpile will still be considered active.

The Contractor shall protect active stockpiles with plastic or geotextile cover, soil stabilization measures, or with linear sediment barrier when precipitation is predicted. Active stockpiles of cold mix asphalt concrete shall be placed on an impervious surface and covered with plastic when precipitation is predicted.

The Contractor shall protect inactive soil stockpiles with a plastic or geotextile cover, or with soil stabilization measures at all times during the rainy season. A linear sediment barrier around the perimeter of the stockpile shall also be used. During the non-rainy season soil stockpiles shall be covered and protected with a linear sediment barrier when precipitation is predicted. The Contractor shall control wind erosion during dry weather as provided in Section 10, "Dust Control," of the Standard Specifications.

Stockpiles of portland cement concrete rubble, asphalt concrete (AC), hot mix asphalt (HMA), AC and HMA rubble, aggregate base, or aggregate subbase shall be covered with plastic or geotextile, or protected with a linear sediment barrier at all times during the rainy season, and when precipitation is predicted during the non-rainy season.

Stockpiles of cold mix asphalt concrete shall be placed on and covered with impermeable material at all times during the rainy season, and when precipitation is predicted during the non-rainy season.

Stockpiles of pressure treated wood shall be covered with impermeable material and placed on pallets at all times during the rainy season, and when precipitation is predicted during the non-rainy season.

The Contractor shall repair or replace linear sediment barriers and covers as needed or as directed by the Engineer to keep them functioning properly. Sediment shall be removed when it accumulates to 1/3 of the linear sediment barrier height.

WASTE MANAGEMENT

Solid Waste

The Contractor shall not allow litter or debris to accumulate anywhere on the construction site, including storm drain grates, trash racks, and ditch lines. The Contractor shall pick up and remove trash and debris from the construction site at least once a week. The WPCM shall monitor solid waste storage and disposal procedures on the construction site. The Contractor shall provide enough dumpsters of sufficient size to contain the solid waste generated by the project. Dumpsters shall be emptied when refuse reaches the fill line. Dumpsters shall be watertight. The Contractor shall not wash out dumpsters on the construction site. The Contractor shall provide additional containers and more frequent pickup during the demolition phase of construction

Solid waste includes:

- A. Brick,
- B. Mortar,
- C. Timber,
- D. Metal scraps,
- E. Sawdust,
- F. Pipe,
- G. Electrical cuttings,
- H. Non-hazardous equipment parts,
- I. Styrofoam and other packaging materials,
- J. Vegetative material and plant containers from highway planting, and
- K. Litter and smoking material, including litter generated randomly by the public.

Trash receptacles shall be provided and used in the Contractor's yard, field trailers, and locations where workers gather for lunch and breaks.

Hazardous Waste

The Contractor shall implement hazardous waste management practices when waste is generated on the construction site from the following substances:

- A. Petroleum products,
- B. Asphalt products,
- C. Concrete curing compound,
- D. Pesticides,
- E. Acids,
- F. Paints,

- G. Stains,
- H. Solvents,
- I. Wood preservatives,
- J. Roofing tar, and
- K. Materials classified as hazardous by California Code of Regulations, Title 22, Division 4.5; or listed in CFR Title 40, Parts 110, 117, 261, or 302.

Nothing in these special provisions shall relieve the Contractor of the responsibility for compliance with Federal, State, and local laws regarding storage, handling, transportation, and disposal of hazardous wastes.

The WPCM shall oversee and enforce hazardous waste management practices. Production of hazardous materials and hazardous waste on the construction site shall be kept to a minimum. Perimeter controls, containment structures, covers, and liners shall be repaired or replaced when damaged.

The Contractor shall have a laboratory certified by the Department of Health Services (DHS) sample and test waste when hazardous material levels are unknown to determine safe methods for storage and disposal.

The Contractor shall segregate potentially hazardous waste from nonhazardous waste at the construction site. Hazardous waste shall be handled, stored, and disposed of as required in California Code of Regulations, Title 22, Division 4.5, Section 66262.34; and in CFR Title 49, Parts 261, 262, and 263.

The Contractor shall store hazardous waste in sealed containers constructed and labeled with the contents and date accumulated as required in California Code of Regulations, Title 22, Division 4.5; and in CFR Title 49, Parts 172, 173, 178, and 179. Hazardous waste containers shall be kept in temporary containment facilities conforming to the provisions in "Material Storage" of these special provisions.

There shall be adequate storage volume and containers shall be conveniently located for hazardous waste collection. Containers of hazardous waste shall not be overfilled and hazardous wastes shall not be mixed. Containers of dry waste that are not watertight shall be stored on pallets. The Contractor shall not allow potentially hazardous waste to accumulate on the ground. Hazardous waste shall be stored away from storm drains, watercourses, moving vehicles, and equipment.

The Contractor shall clean water based or oil based paint from brushes or equipment within a contained area and shall not contaminate soil, watercourses, or storm drain systems. Paints, thinners, solvents, residues, and sludges that cannot be recycled or reused shall be disposed of as hazardous waste. When thoroughly dry, latex paint and paint cans, used brushes, rags, absorbent materials, and drop cloths shall be disposed of as solid waste.

The Contractor shall dispose of hazardous waste within 90 days of being generated. Hazardous waste shall be disposed of by a licensed hazardous waste transporter using uniform hazardous waste manifest forms and taken to a Class I Disposal Site. A copy of the manifest shall be provided to the Engineer.

Contaminated Soil

The Contractor shall identify contaminated soil from spills or leaks by noticing discoloration, odors, or differences in soil properties. Soil with evidence of contamination shall be sampled and tested by a laboratory certified by DHS. If levels of contamination are found to be hazardous, the soil shall be handled and disposed of as hazardous waste.

Contaminated soil existing on the construction site before mobilization shall be handled in accordance with "AERIALY DEPOSITED LEAD" of these special provisions.

The Contractor shall prevent the flow of water, including ground water, from mixing with contaminated soil by using one or a combination of the following measures:

- A. Berms,
- B. Cofferdams,
- C. Grout curtains,
- D. Freeze walls, or
- E. Concrete seal course.

If water mixes with contaminated soil and becomes contaminated, the water shall be sampled and tested by a laboratory certified by the DHS. If levels of contamination are found to be hazardous, the water shall be handled and disposed of as hazardous waste.

Concrete Waste

The Contractor shall implement practices to prevent the discharge of portland cement concrete, AC, or HMA waste into storm drain systems or watercourses.

Portland cement concrete, AC, or HMA waste shall be collected at the following locations and disposed of:

- A. Where concrete material, including grout, is used;
- B. Where concrete dust and debris result from demolition;
- C. Where sawcutting, coring, grinding, grooving, or hydro-concrete demolition of portland cement concrete, AC, or HMA creates a residue or slurry; or
- D. Where concrete trucks or other concrete-coated equipment is cleaned at the construction site.

Sanitary and Septic Waste

Wastewater from sanitary or septic systems shall not be discharged or buried within the Department right of way. The WPCM shall inspect sanitary or septic waste storage and monitor disposal procedures at least weekly. Sanitary facilities that discharge to the sanitary sewer system shall be properly connected and free from leaks.

The Contractor shall obtain written approval from the local health agency, city, county, and sewer district before discharging from a sanitary or septic system directly into a sanitary sewer system, and provide a copy to the Engineer. The Contractor shall comply with local health agency requirements when using an on-site disposal system.

Liquid Waste

The Contractor shall not allow construction site liquid waste, including the following, to enter storm drain systems or watercourses:

- A. Drilling slurries or fluids,
- B. Grease-free or oil-free wastewater or rinse water,
- C. Dredgings,
- D. Liquid waste running off a surface including wash or rinse water, or
- E. Other non-storm water liquids not covered by separate permits.

The Contractor shall hold liquid waste in structurally sound, leak proof containers such as:

- A. Sediment traps,
- B. Roll-off bins, or
- C. Portable tanks.

Liquid waste containers shall be of sufficient quantity and volume to prevent spills and leaks. The containers shall be stored at least 15 m from storm drains, watercourses, moving vehicles, and equipment.

The Contractor shall remove and dispose of deposited solids from sediment traps as provided in "Solid Waste" of these special provisions, unless determined infeasible by the Engineer.

Liquid waste may require testing to determine hazardous material content before disposal.

Drilling fluids and residue shall be disposed of outside the highway right of way. If the Engineer determines that an appropriate location is available, fluids and residue exempt under California Code of Regulations, Title 23, Section 2511(g) may be dried by infiltration and evaporation in a leak proof container. The remaining solid waste may be disposed of as provided in "Solid Waste" of these special provisions.

NON-STORM WATER MANAGEMENT

Water Control and Conservation

The Contractor shall prevent erosion or the discharge of pollutants into storm drain systems or watercourses by managing the water used for construction operations. The Contractor shall obtain the Engineer's approval before washing anything on the construction site with water that could discharge into a storm drain system or watercourse. Discharges shall be reported to the Engineer immediately.

The Contractor shall implement water conservation practices when water is used on the construction site. Irrigation areas shall be inspected and watering schedules shall be adjusted to prevent erosion, excess watering, or runoff. The Contractor shall shut off the water source to broken lines, sprinklers, or valves, and they shall be repaired as soon as possible. When possible, water from waterline flushing shall be reused for landscape irrigation. Paved areas shall be swept and vacuumed, not washed with water.

Construction water runoff, including water from water line repair, shall be directed to areas to infiltrate into the ground and shall not be allowed to enter storm drain systems or watercourses. Spilled water shall not be allowed to escape water truck filling areas. When possible, the Contractor shall direct water from off-site sources around the construction site, or shall minimize contact with the construction site.

Illegal Connection and Discharge Detection and Reporting

The Contractor shall inspect the construction site and the site perimeter before beginning work for evidence of illegal connections, discharges, or dumping. Subsequently, the construction site and perimeter shall be inspected on a frequent, predetermined schedule.

The Contractor shall immediately notify the Engineer when illegal connections, discharges, or dumping are discovered. The Contractor shall take no further action unless directed by the Engineer. Unlabeled or unidentifiable material shall be assumed to be hazardous.

The Contractor shall look for the following evidence of illegal connections, discharges, or dumping:

- A. Debris or trash piles,

- B. Staining or discoloration on pavement or soils,
- C. Pungent odors coming from drainage systems,
- D. Discoloration or oily sheen on water,
- E. Stains or residue in ditches, channels or drain boxes,
- F. Abnormal water flow during dry weather,
- G. Excessive sediment deposits,
- H. Nonstandard drainage junction structures, or
- I. Broken concrete or other disturbances near junction structures.

Vehicle and Equipment Cleaning

The Contractor shall limit vehicle and equipment cleaning or washing on the construction site to that necessary to control vehicle tracking or hazardous waste. Vehicles and equipment shall not be cleaned on the construction site with soap, solvents, or steam until the Engineer has been notified. The resulting waste shall be contained and recycled, or disposed of as provided in "Liquid Waste" or "Hazardous Waste" of these special provisions, whichever is applicable. The Contractor shall not use diesel to clean vehicles or equipment, and shall minimize the use of solvents.

The Contractor shall clean or wash vehicles and equipment in a structure equipped with disposal facilities. If using a structure is not possible, vehicles and equipment shall be cleaned or washed in an outside area with the following characteristics:

- A. Located at least 15 m from storm drainage systems or watercourses,
- B. Paved with AC, HMA or portland cement concrete,
- C. Surrounded by a containment berm, and
- D. Equipped with a sump to collect and dispose of wash water.

When washing vehicles or equipment with water, the Contractor shall use as little water as possible. Hoses shall be equipped with a positive shutoff valve.

Wash racks shall discharge to a recycle system or to another system approved by the Engineer. Sumps shall be inspected regularly, and liquids and sediments shall be removed as needed.

Vehicle and Equipment Fueling and Maintenance

The Contractor shall fuel or perform maintenance on vehicles and equipment off the construction site whenever practical. When fueling or maintenance must be done at the construction site, the Contractor shall designate a site, or sites, and obtain approval from the Engineer before using. The fueling or maintenance site shall be protected from storm water, shall be on level ground, and shall be located at least 15 m from drainage inlets or watercourses. The WPCM shall inspect the fueling or maintenance site regularly. Mobile fueling or maintenance shall be kept to a minimum.

The Contractor shall use containment berms or dikes around the fueling and maintenance area. Adequate amounts of absorbent spill cleanup material and spill kits shall be kept in the fueling and maintenance area and on fueling trucks. Spill cleanup material and kits shall be disposed of immediately after use. Drip pans or absorbent pads shall be used during fueling or maintenance unless performed over an impermeable surface.

Fueling or maintenance operations shall not be left unattended. Fueling nozzles shall be equipped with an automatic shutoff control. Vapor recovery fueling nozzles shall be used where

required by the Air Quality Management District. Nozzles shall be secured upright when not in use. Fuel tanks shall not be topped-off.

The Contractor shall recycle or properly dispose of used batteries and tires.

Material and Equipment Used Over Water

Drip pans and absorbent pads shall be placed under vehicles or equipment used over water, and an adequate supply of spill cleanup material shall be kept with the vehicle or equipment. Drip pans or plastic sheeting shall be placed under vehicles or equipment on docks, barges, or other surfaces over water when the vehicle or equipment will be idle for more than one hour.

The Contractor shall provide watertight curbs or toe boards on barges, platforms, docks, or other surfaces over water to contain material, debris, and tools. Material shall be secured to prevent spills or discharge into water due to wind.

Structure Removal Over or Adjacent to Water

The Contractor shall not allow demolished material to enter storm water systems or watercourses. The Contractor shall use covers and platforms approved by the Engineer to collect debris. Attachments shall be used on equipment to catch debris on small demolition operations. Debris catching devices shall be emptied regularly and debris shall be handled as provided in "Waste Management" of these special provisions.

The WPCM shall inspect demolition sites within 15 m of storm water systems or watercourses every day.

Paving, Sealing, Sawcutting, and Grinding Operations

The Contractor shall prevent the following material from entering storm drain systems or water courses:

- A. Cementitious material,
- B. Asphaltic material,
- C. Aggregate or screenings,
- D. Grinding or sawcutting residue,
- E. Pavement chunks, or
- F. Shoulder backing.

The Contractor shall cover drainage inlets and use linear sediment barriers to protect downhill watercourses until paving, sealing, sawcutting, or grinding operations are completed and excess material has been removed. Drainage inlets and manholes shall be covered during the application of seal coat, tack coat, slurry seal, or fog seal.

During the rainy season or when precipitation is predicted, paving, sawcutting, and grinding operations shall be limited to places where runoff can be captured. Seal coat, tack coat, slurry seal, or fog seal operations shall not begin if precipitation is predicted for the application or the curing period. The Contractor shall not excavate material from existing roadways during precipitation.

The Contractor shall vacuum up slurry from sawcutting operations immediately after the slurry is produced. Slurry shall not be allowed to run onto lanes open to public traffic or off the pavement.

The Contractor shall collect residue from portland cement concrete grinding operations with a vacuum attachment on the grinding machine. The residue shall not be left on the pavement or allowed to flow across the pavement.

Material excavated from existing roadways may be stockpiled as provided in "Stockpile Management" of these special provisions if approved by the Engineer. AC or HMA chunks used in embankment shall be placed above the water table and covered by at least 0.3-m of material.

Substances used to coat asphalt trucks and equipment shall not contain soap, foaming agents, or toxic chemicals.

Thermoplastic Striping and Pavement Markers

Thermoplastic striping and preheating equipment shutoff valves shall work properly at all times when on the construction site. The Contractor shall not preheat, transfer, or load thermoplastic within 15 m of drainage inlets or watercourses. The Contractor shall not fill the preheating container to more than 150 mm from the top. Truck beds shall be cleaned daily of scraps or melted thermoplastic.

The Contractor shall not unload, transfer, or load bituminous material for pavement markers within 15 m of drainage inlets or watercourses. All pressure shall be released from melting tanks before removing the lid to fill or service. Melting tanks shall not be filled to more than 150 mm from the top.

The Contractor shall collect bituminous material from the roadway after marker removal.

Pile Driving

The Contractor shall keep spill kits and cleanup material at pile driving locations. Pile driving equipment shall be parked over drip pans, absorbent pads, or plastic sheeting where possible. When not in use, pile driving equipment shall be stored at least 15 m from concentrated flows of storm water, drainage courses, or inlets. The Contractor shall protect pile driving equipment by parking it on plywood and covering it with plastic when precipitation is predicted. The WPCM shall inspect the pile driving area every day for leaks and spills.

The Contractor shall use vegetable oil instead of hydraulic fluid when practical.

Concrete Curing

The Contractor shall not overspray chemical curing compound. Drift shall be minimized by spraying as close to the concrete as possible. Drainage inlets shall be covered before applying curing compound.

The Contractor shall minimize the use and discharge of water by using wet blankets or similar methods to maintain moisture when curing concrete.

Concrete Finishing

The Contractor shall collect and dispose of water and solid waste from high-pressure water blasting. Drainage inlets within 15 m shall be covered before sandblasting. The nozzle shall be kept as close to the surface of the concrete as possible to minimize drift of dust and blast material. Blast residue may contain hazardous material.

Containment structures for concrete finishing operations shall be inspected for damage before each day of use and before predicted precipitation. Liquid and solid waste shall be removed from the containment structure after each work shift.

DEWATERING

Dewatering shall consist of discharging accumulated storm water, ground water, or surface water from excavations or temporary containment facilities. The Contractor shall discharge water within the limits of the project.

Dewatering discharge shall not cause erosion, scour, or sedimentary deposits that impact natural bedding materials.

The Contractor shall conduct dewatering activities in accordance with the Field Guide for Construction Dewatering available at:

<http://www.dot.ca.gov/hq/construc/stormwater/manuals.htm>

Before dewatering the Contractor shall submit a Dewatering and Discharge Plan to the Engineer in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications and "Water Pollution Control," of these special provisions. At a minimum, the Dewatering and Discharge Plan shall include the following:

- A. A title sheet and table of contents;
- B. A description of the dewatering and discharge operations detailing the locations, quantity of water, equipment, and discharge point;
- C. The estimated schedule for dewatering and discharge (begin and end dates, intermittent or continuous);
- D. Discharge alternatives such as dust control or percolation; and
- E. Visual monitoring procedures with inspection log.

The Contractor shall not discharge storm water or non-storm water that has an odor, discoloration other than sediment, an oily sheen, or foam on the surface and shall notify the Engineer immediately upon discovery.

If water cannot be discharged within the project limits due to site constraints it shall be disposed of in the same manner specified for material in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

PAYMENT

The contract lump sum price paid for construction site management shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in spill prevention and control, material management, waste management, non-storm water management, and dewatering and identifying, sampling, testing, handling, and disposing of hazardous waste, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.04 STREET SWEEPING

Street sweeping shall be conducted where sediment is tracked from the job site onto paved roads, as described in the approved Storm Water Pollution Prevention Plan (SWPPP) in accordance with "Water Pollution Control" of these special provisions, and as directed by the Engineer.

Street sweeping shall be one of the water pollution control practices for sediment control. The SWPPP shall include the use of street sweeping. Street sweeping shall be performed in accordance with Section 4, SC-7 in the Construction Site Best Management Practices Manual of the Caltrans Storm Water Quality Handbooks.

The number of street sweepers shall be as designated in the approved SWPPP. The Contractor shall maintain at least one sweeper on the job site at all times during the period that

sweeping work is required. Sweepers shall be self-loading, motorized, and shall have spray nozzles. Sweepers may include a vacuum apparatus.

Street sweeping shall start at the beginning of clearing and grubbing and shall continue until completion of the project, or as directed by the Engineer. Street sweeping shall be performed immediately after soil disturbing activities occur or offsite tracking of material is observed. Street sweeping shall be performed so that dust is minimized. If dust generation is excessive or sediment pickup is ineffective as determined by the Engineer, the use of water or a vacuum will be required.

At the option of the Contractor, collected material may be temporarily stockpiled in accordance with the approved SWPPP. Collected material shall be disposed of at least once per week.

Material collected during street sweeping operations shall be disposed of in conformance with Section 7-1.13, "Disposal of Material Outside The Highway Right Of Way," of the Standard Specifications.

MEASUREMENT AND PAYMENT

The contract lump sum price paid for street sweeping shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in street sweeping, including disposal of collected material, as shown on the plans, as specified in the Standard Specifications, these special provisions, and as directed by the Engineer.

10-1.05 TEMPORARY SOIL BINDER

GENERAL

Summary

This work includes applying, maintaining, and removing temporary soil binder. Soil binder uses a mixture of soil binder, and water to stabilize active and nonactive disturbed soil areas.

The SWPPP must describe and include the use of temporary soil binder as a water pollution control practice for soil stabilization.

Submittals

At least 5 business days before applying soil binder, submit:

1. Material Safety Data Sheet for the soil binder.
2. Product label describing the soil binder as an erosion control product.
3. List of pollutant indicators and potential pollutants for the use of temporary soil binder. Pollutant indicators are described under "Sampling and Analysis Plan for Non-Visible Pollutants" in the Preparation Manual.
4. Determination of acute and chronic toxicity for aquatic organisms conforming to EPA methods for the soil binder.
5. Composition of ingredients including chemical formulation.

Submit a Certificate of Compliance as specified in Section 6-1.07, "Certificates of Compliance" of the Standard Specifications for soil binder:

Quality Control and Assurance

Retain and submit records of temporary soil binder applications including:

1. Compliance with specified rates
2. Application area
3. Application time
4. Quantity

MATERIALS

Soil Binder

The soil binder must be:

1. Nonflammable
2. Nontoxic to aquatic organisms
3. Free from growth or germination inhibiting factors
4. Either a plant-based product or a polymeric emulsion blend

Soil binder classified as a plant-based product must be:

1. A natural high molecular weight polysaccharide
2. A high viscosity hydrocolloid that is miscible in water
3. Functional for at least 180 days
4. Labeled as either guar, psyllium, or starch

Guar must be:

1. A guar gum based product derived from the ground endosperm of the guar plant, *Cyanopsis tetragonolobus*
2. Treated with dispersant agents for easy mixing
3. Able to be diluted at the rate of 1.2 to 6.0 kg per 1000 liters of water

Psyllium must be:

1. Made of the finely ground muciloid coating of plantago ovata or plantago ispaghula seeds
2. Able to dry and form a firm but rewettable membrane

Starch must be a non-ionic, water-soluble granular material derived from corn, potato, or other plant-based source.

Soil binder classified as a polymeric emulsion blend must be:

1. A polymeric emulsion blend with a liquid or dry powder formulation
2. Anionic with a residual monomer content that is at most 0.05 percent by weight
3. Functional for at least 180 days
4. A prepackaged product labeled as containing one of the following as the primary active ingredient of the polymeric emulsion blend:
 - 4.1 Acrylic copolymers and polymers
 - 4.2 Polymers of methacrylates and acrylates
 - 4.3 Copolymers of sodium acrylates and acrylamides
 - 4.4 Polyacrylamide (PAM) and copolymer of acrylamide

4.5 Hydrocolloid polymers

Coloring Agent

Use a biodegradable, nontoxic coloring agent free from copper, mercury, and arsenic to ensure the hydraulic mulch contrasts with the application area.

CONSTRUCTION

Application

Apply soil binder:

1. Per the manufacturer's recommendations for the job site soil conditions. Prewet the area if recommended by the manufacturer.
2. From 2 or more directions to achieve a continuous cover.
3. During dry weather or at least 24 hours before predicted rain.

Do not apply soil binder if:

1. Water is standing on or moving across the soil surface
2. Soil is frozen
3. Air temperature is below 4 °C during the tackifier curing period unless allowed by the manufacturer and approved by the Engineer

Do not over-spray soil binder onto the traveled way, sidewalks, lined drainage channels, or existing vegetation.

Maintenance

Reapply soil binder within 24 hours of discovering visible erosion, unless the Engineer approves a longer period.

Temporary soil binder disturbed or displaced by the Contractor's vehicles, equipment, or operations must be reapplied at the Contractor's expense.

Cleanup, repair, removal, disposal, or replacement due to improper installation or the Contractor's negligence are not included in the cost for performing maintenance.

Removal

Remove soil binder by mechanically blending it into the soil with track laying equipment, disking, or other approved method.

MEASUREMENT AND PAYMENT

Temporary soil binder is measured by the square meter from measurements along the slope of the areas covered by the soil binder.

The contract item price paid per square meter for temporary soil binder includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in applying temporary soil binder, complete in place, including removal of soil binder, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The State and the Contractor share the cost of maintaining the temporary soil binder. The State determines the maintenance cost under Section 9-1.03, "Force Account Payment," of the Standard Specifications and pays to the Contractor one-half of that cost.

10-1.06 TEMPORARY COVER

Temporary cover shall be furnished, installed, maintained, and later removed at the locations shown on the approved Storm Water Pollution Prevention Plan (SWPPP) in conformance with "Water Pollution Control" of these special provisions, and in conformance with details shown on the plans and these special provisions.

Temporary cover shall be one of the water pollution control practices for soil stabilization. The SWPPP shall include the use of temporary cover.

MATERIALS

Temporary Cover Fabric

Temporary cover fabric shall be either a geotextile (engineering fabric) or a geomembrane (plastic sheeting) conforming to the following requirements:

1. Geotextile shall be a woven, slit film fabric which is also known as woven tape. The fabric shall be nonbiodegradable, resistant to deterioration by sunlight, and inert to most soil chemicals. Edges of the film fabric shall be selvage or serge to prevent unraveling. The film fabric shall also conform to the following requirements:

Specification	Requirements
Grab tensile strength (25-mm grip), kilonewtons, min. ASTM Designation: D4632*	0.89
Elongation at break, percent min. ASTM Designation: D4632*	15
Toughness, kilonewtons, min. (percent elongation x grab tensile strength)	13.3
Permittivity, l/sec, max. (liters per minute per square meter) ASTM Designation: D 4491	0.08 (244)
Ultraviolet light stability, percent tensile strength retained after 500 hours, min. ASTM Designation: D 4355 (xenon arc lamp method)	70

* or appropriate test method for specific polymer

2. The geomembrane shall consist of 0.25-mm thick, single-ply material in conformance with the requirements in ASTM Designation: D 5199.

Temporary cover fabric shall be manufactured from polyethylene, polypropylene, or comparable polymers. The polymer materials may be virgin, recycled, or a combination of virgin and recycled materials. The polymer materials shall not contain biodegradable filler materials that can degrade the physical or chemical characteristics of the finished fabric. The Engineer may order tests to confirm the absence of biodegradable filler materials in conformance with the requirements in ASTM Designation: E 204 (Fourier Transformed Infrared Spectroscopy-FTIR).

Restrainers

Restrainers for securing the temporary cover fabric on slopes and stockpiles shall consist of one or a combination of the following:

1. Gravel-filled bags used as restrainers shall be knotted, roped, and placed at a maximum of 2 m apart on the temporary cover fabric as shown on the plans. Gravel-filled bags shall be between 13 kg and 22 kg in mass, between 600 mm and 800 mm in length, and between 400 mm and 500 mm in width. Gravel bag fabric shall be nonwoven polypropylene geotextile with a minimum unit weight of 270 g/m². The fabric shall have a minimum grab tensile strength (25-mm grip) of 0.89-kN in conformance with the requirements in ASTM Designation: D 4632, and an ultraviolet (UV) stability of 70 percent tensile strength retained after 500 hours in conformance with the requirements in ASTM Designation: D 4355, xenon arc lamp method. Gravel shall consist of noncohesive material between 10 mm and 20 mm in diameter, free of clay balls, organic matter, and other deleterious material. The openings of gravel-filled bags shall be secured to prevent escape of gravel.
2. Restrainers consisting of a steel anchor with a wooden lath shall be fabricated and placed as shown on the plans. Wooden lath shall conform to the provisions in Section 20-2.12, "Lumber," of the Standard Specifications and shall be fir or pine, 38 mm x 89 mm in size, and 2.4 m in length. The wooden lath shall be secured to the temporary cover with steel anchors placed 1.2 m apart along the lath.

The Contractor may use an alternative restrainer if approved by the Engineer in writing. The Contractor shall submit details for an alternative restrainer to the Engineer before installation. The alternative restrainer shall be installed and maintained in conformance with these special provisions.

INSTALLATION

Temporary cover shall be installed as follows:

1. Temporary cover fabric shall be placed and anchored as shown on the plans.
2. Abutting edges of the temporary cover fabric shall overlap a minimum of 600 mm. Nonabutting edges shall be embedded in the soil a minimum of 150 mm.
3. Restrainers shall be placed at the overlap area and along the toe of the slope. Restrainers outside the overlap areas shall be placed at a maximum spacing of 2.4 m.
4. Steel anchors shall be installed to allow the leg of the steel anchor to pierce through the temporary cover fabric into the slope with the crown section securing the wooden lath firmly against the slope.
5. Earthen berm, a linear sediment barrier, shall be constructed adjacent to the toe of the slope with a minimum height of 200 mm and a minimum width of 940 mm. The earthen berm shall be hand or mechanically compacted. Alternative linear sediment barrier may be used if approved by the Engineer in writing.

If the Contractor removes the temporary cover in order to facilitate other work, the temporary cover shall be replaced and secured.

When no longer required as determined by the Engineer, temporary cover shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Ground disturbances, including holes and depressions, caused by the installation and removal of the temporary cover shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MAINTENANCE

The Contractor shall maintain the temporary cover throughout the contract to prevent displacement or migration of the material on the slope or stockpiled.

Temporary cover shall be maintained to minimize exposure of the protected area. Restrainers shall be relocated and secured as needed to restrain the temporary cover fabric in place. Temporary cover that breaks free shall be immediately secured. Holes, tears, and voids in the temporary cover fabric shall be patched, repaired, or replaced. When patches or repairs are unacceptable as determined by the Engineer, the temporary cover shall be replaced.

Temporary cover shall be repaired or replaced on the same day when the damage occurs. Damage to the temporary cover resulting from the Contractor's vehicles, equipment, or operations shall be repaired at the Contractor's expense.

MEASUREMENT AND PAYMENT

The quantity of temporary cover to be paid for will be measured by the square meter for the actual area covered.

The contract price paid per square meter for temporary cover shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing temporary cover, complete in place, including trench excavation and backfill, maintenance, and removal of temporary cover, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.07 TEMPORARY CONCRETE WASHOUT FACILITY

Temporary concrete washout facilities shall be constructed, maintained, and later removed at the locations shown on the approved Storm Water Pollution Prevention Plan (SWPPP) in conformance with "Water Pollution Control" of these special provisions, and in conformance with details shown on the plans and these special provisions.

Temporary concrete washout facilities shall be one of the water pollution control practices for waste management and materials pollution control. The SWPPP shall include the use of temporary concrete washout facilities.

MATERIALS

Plastic Liner

Plastic liners shall be single ply, new polyethylene sheeting, a minimum of 0.25-mm thick and shall be free of holes, punctures, tears or other defects that compromise the impermeability of the material. Plastic liners shall not have seams or overlapping joints.

Gravel-filled Bags

Gravel bag fabric shall be nonwoven polypropylene geotextile (or comparable polymer) and shall conform to the following requirements:

Specification	Requirements
Mass per unit area, grams per square meter, min. ASTM Designation: D 5261	270
Grab tensile strength (25-mm grip), kilonewtons, min. ASTM Designation: D4632*	0.89
Ultraviolet stability, percent tensile strength retained after 500 hours, ASTM Designation: D4355, xenon arc lamp method	70

* or appropriate test method for specific polymer

Gravel bags shall be between 600 mm and 800 mm in length, and between 400 mm and 500 mm in width.

Yarn used for binding gravel bags shall be as recommended by the manufacturer or bag supplier and shall be of a contrasting color.

Gravel shall be between 10 mm and 20 mm in diameter, and shall be clean and free from clay balls, organic matter, and other deleterious materials.

The opening of gravel-filled bags shall be secured to prevent gravel from escaping. Gravel-filled bags shall be between 13 kg and 22 kg in mass.

Straw Bales

Straw for straw bales shall conform to the provisions in Section 20-2.06, "Straw," of the Standard Specifications.

Straw bales shall be a minimum of 360 mm in width, 450 mm in height, 900 mm in length and shall have a minimum mass of 23 kg. The straw bale shall be composed entirely of vegetative matter, except for binding material.

Straw bales shall be bound by either wire, nylon or polypropylene string. Jute or cotton binding shall not be used. Baling wire shall be a minimum 1.57 mm in diameter. Nylon or polypropylene string shall be approximately 2 mm in diameter with 360 N of breaking strength.

Stakes

Stakes shall be wood or metal. Wood stakes shall be untreated fir, redwood, cedar, or pine and cut from sound timber. They shall be straight and free of loose or unsound knots or other defects which would render them unfit for the purpose intended. Wood stakes shall be a minimum 50 mm x 50 mm in size. Metal stakes may be used as an alternative, and shall be a minimum 13 mm in diameter. Stakes shall be a minimum 1.2 m in length. The tops of the metal stakes shall be bent at a 90-degree angle or capped with an orange or red plastic safety cap that fits snugly to the metal stake. The Contractor shall submit a sample of the metal stake and plastic cap, if used, for the Engineer's approval before installation.

Staples

Staples shall be as shown on the plans. An alternative attachment device such as geotextile pins or plastic pegs may be used instead of staples. The Contractor shall submit a sample of the alternative attachment device for the Engineer's approval before installation.

Signs

Wood posts for signs shall conform to the provisions in Section 56-2.02B, "Wood Posts," of the Standard Specifications. Lag screws shall conform to the provisions in Section 56-2.02D, "Sign Panel Fastening Hardware," of the Standard Specifications.

Plywood shall be freshly painted for each installation with not less than 2 applications of flat white paint. Sign letters shown on the plans shall be stenciled with commercial quality exterior black paint. Testing of paint will not be required.

INSTALLATION

Temporary concrete washout facilities shall be as follows:

1. Temporary concrete washout facilities shall be installed before beginning placement of concrete and located a minimum of 15 m from storm drain inlets, open drainage facilities, and water courses unless determined infeasible by the Engineer. Temporary concrete washout facilities shall be located away from construction traffic or access areas at a location determined by the Contractor and approved by the Engineer.
2. A sign shall be installed adjacent to each washout facility at a location determined by the Contractor and approved by the Engineer. Signs shall be installed in conformance with the provisions in Section 56-2.03, "Construction," and Section 56-2.04, "Sign Panel Installation," of the Standard Specifications.
3. The length and width of a temporary concrete washout facility may be increased from the minimum dimensions shown on the plans upon approval of the Engineer.
4. Temporary concrete washout facilities shall be constructed in sufficient quantity and size to contain liquid and concrete waste generated by washout operations for concrete wastes. These facilities shall be constructed to contain liquid and concrete waste without seepage, spills, or overflow.
5. Berms for below grade temporary concrete washout facilities shall be constructed from compacted native material. Gravel may be used in conjunction with compacted native material.
6. A plastic liner shall be installed in below grade temporary concrete washout facilities.

Details for an alternative temporary concrete washout facility shall be submitted to the Engineer for approval at least 7 days before installation.

When temporary concrete washout facilities are no longer required for the work, as determined by the Engineer, the hardened concrete and liquid residue shall be removed and disposed of in conformance with the provisions in Section 15-3.02, "Removal Methods," of the Standard Specifications. Temporary concrete washout facilities shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Ground disturbance, including holes and depressions, caused by the installation and removal of the temporary concrete washout facilities shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MAINTENANCE

Temporary concrete washout facilities shall be maintained to provide adequate holding capacity with a minimum freeboard of 300 mm. Maintaining temporary concrete washout facilities shall include removing and disposing of hardened concrete and returning the facilities to a functional condition. Hardened concrete materials shall be removed and disposed of in conformance with the provisions in Section 15-3.02, "Removal Methods," of the Standard Specifications. Holes, rips, and voids in the plastic liner shall be patched and repaired by taping or the plastic liner shall be replaced. The plastic liner shall be replaced when patches or repairs compromise the impermeability of the material as determined by the Engineer.

Gravel bags shall be replaced when the bag material is ruptured or when the yarn has failed, allowing the bag contents to spill out.

Temporary concrete washout facilities shall be repaired or replaced on the same day the damage occurs. Damage to temporary concrete washout facilities resulting from the Contractor's vehicles, equipment, or operations shall be repaired at the Contractor's expense.

MEASUREMENT AND PAYMENT

Quantities of temporary concrete washout facilities will be measured as units determined from actual count in place.

The contract unit price paid for temporary concrete washout facility shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in constructing a temporary concrete washout facility, complete in place, including excavation and backfill, maintenance, and removal, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.08 TEMPORARY CONCRETE WASHOUT BIN

GENERAL

Summary

This work includes removal and disposal of concrete waste by furnishing, maintaining, and removing temporary concrete washout bins.

The SWPPP must describe and include the use of temporary concrete washout bins as a water pollution control practice for waste management and materials pollution control.

Submittals

At least 5 business days before concrete operations start, submit:

1. Location of the washout bins
2. Name and location of the off-site concrete waste disposal facility to receive concrete waste
3. Copy of the permit issued by RWQCB for the off-site commercial disposal facility
4. Copy of the license for the off-site commercial disposal facility
5. Copy of the permit issued by the state or local agency having jurisdiction over the disposal facility if the disposal site is located outside of the State of California

Quality Control and Assurance

Retain and submit records of disposed concrete waste including:

1. Weight tickets
2. Delivery and removal of concrete washout bins

MATERIALS

Concrete Washout Bin

Concrete washout bin must:

1. Be a commercially available watertight container
2. Have sufficient capacity to contain all liquid and concrete waste generated by washout operations without seepage or spills

3. Be not less than 4.2 cubic meters of capacity
4. Be a roll-off bin and may include folding steel ramps
5. Be labeled for the exclusive use as a concrete waste and washout facility

Concrete Washout Sign

Concrete washout sign must:

1. Comply with the provisions in Section 12-3.06B, "Portable Signs" of the Standard Specifications
2. Be approved by the Engineer
3. Consist of a base, framework and a sign panel
4. Be made out of plywood
5. Be a minimum size of 610 mm by 1200 mm
6. Read "Concrete Washout" with black letters, 75 mm high, on a white background

CONSTRUCTION

Placement

Place concrete washout bins at the job site:

1. Before concrete placement activities begin
2. In the immediate area of the concrete work as approved by the Engineer
3. No closer than 15 m from storm drain inlets, open drainage facilities, ESAs, or watercourses
4. Away from construction traffic or public access areas

Install a concrete washout sign adjacent to each temporary concrete washout bin location.

Operation

Use concrete washout bins for:

1. Washout from concrete delivery trucks
2. Slurries containing portland cement concrete or hot mix asphalt from sawcutting, coring, grinding, grooving, and hydro-concrete demolition
3. Concrete waste from mortar mixing stations

Relocate concrete washout bins as needed for concrete construction work.

Replace concrete washout bins when filled to capacity. Do not fill higher than 150 mm below rim.

Your WPCM must inspect concrete washout bins:

1. Daily if concrete work occurs daily
2. Weekly if concrete work does not occur daily

Maintenance

When relocating or transporting a concrete washout bin within the project site, secure the concrete washout bin to prevent spilling of concrete waste material. If any spilled material is observed, remove the spilled material and place it into the concrete washout bin.

Removal

Dispose of concrete waste material at a facility specifically licensed to receive solid concrete waste, liquid concrete waste, or both. Remove and dispose of concrete waste within 2 days of the concrete washout bin becoming filled to capacity.

MEASUREMENT AND PAYMENT

Temporary concrete washout bin is measured by the actual count of concrete washout bins in place.

The contract unit price paid for temporary concrete washout bin includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing, maintaining, and removing the concrete washout bin, including removal and disposal of concrete waste, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.09 TEMPORARY FIBER ROLL

Temporary fiber roll shall be furnished, installed, maintained, and later removed at the locations shown on the approved Storm Water Pollution Prevention Plan (SWPPP) in conformance with "Water Pollution Control" of these special provisions, and in conformance with details shown on the plans and these special provisions.

Temporary fiber roll shall be installed on excavation and embankment slopes and other disturbed soil areas, active or nonactive.

Temporary fiber roll shall be one of the water pollution control practices for sediment control. The SWPPP shall include the use of temporary fiber roll.

Temporary fiber roll shall be either Type 1 or Type 2.

MATERIALS

Fiber Roll

Fiber roll shall be either:

1. Constructed with a premanufactured blanket consisting of either wood excelsior, rice or wheat straw, or coconut fibers or a combination of these materials. The blanket shall be between 2.0 m and 2.4 m in width and between 20 m and 29 m in length. Wood excelsior shall be individual fibers, of which 80 percent shall be 150 mm or longer in length. The blanket shall have a photodegradable plastic netting or biodegradable jute, sisal, or coir fiber netting on at least one side. The blanket shall be rolled along the width and secured with jute twine spaced 2 m apart along the full length of the roll and placed 150 mm from the ends of each roll. The finished roll shall be between 200 mm and 250 mm in diameter, a minimum of 6 m in length, and shall weigh a minimum 0.81-kg/m. More than one blanket may be required to achieve the finished roll diameter. When more than one blanket is required, blankets shall be jointed longitudinally with an overlap of 150 mm along the length of the blanket.
2. A premanufactured roll of rice or wheat straw, wood excelsior, or coconut fiber encapsulated within a photodegradable plastic or biodegradable jute, sisal, or coir fiber netting. The netting shall have a minimum durability of one year after installation. The netting shall be secured tightly at each end of the roll. Rolls shall be between 200 mm and 300 mm in diameter. Rolls between 200 mm and 250 mm in diameter shall have a

minimum weight of 1.6 kg/m and a minimum length of 6 m. Rolls between 250 mm and 300 mm in diameter shall have a minimum weight of 4.5 kg/m and a minimum length of 3 m.

Stakes

Wood stakes shall be a minimum of 19 mm x 19 mm x 450 mm in size for Type 1 installation, or a minimum of 19 mm x 38 mm x 450 mm in size for Type 2 installation. Wood stakes shall be untreated fir, redwood, cedar, or pine and cut from sound timber. They shall be straight and free of loose or unsound knots and other defects which would render them unfit for the purpose intended. Metal stakes shall not be used.

Rope

Rope shall be biodegradable, such as sisal or manila, with a minimum diameter of 6.35 mm.

INSTALLATION

Temporary fiber roll shall be installed as follows:

1. Temporary fiber roll (Type 1): Furrows shall be constructed to a depth between 50 mm and 100 mm, and to a sufficient width to hold the fiber roll. Stakes shall be installed 600 mm apart along the length of the fiber rolls and stopped at 300 mm from each end of the rolls. Stakes shall be driven to a maximum of 50 mm above, or flush with the top of the roll.
2. Temporary fiber roll (Type 2): Rope and notched stakes shall be used to restrain the fiber rolls against the slope. Stakes shall be driven into the slope until the notch is even with the top of the fiber roll. Rope shall be knotted at each stake and laced between stakes. After installation of the rope, stakes shall be driven into the slope such that the rope will hold the fiber roll tightly to the slope. Furrows will not be required.
3. Temporary fiber rolls shall be placed 3 m apart along the slope for slope inclination (vertical:horizontal) of 1:2 and steeper, 4.5 m apart along the slope for slope inclination between 1:2 and 1:4, 6 m apart along the slope for slope inclination between 1:4 and 1:10, and a maximum of 15 m apart along the slope for slope inclination of 1:10 and flatter.
4. The bedding area for the fiber roll shall be cleared of obstructions including rocks, clods, and debris greater than 25 mm in diameter before installation.
5. Temporary fiber rolls shall be installed approximately parallel to the slope contour.
6. Temporary fiber rolls shall be installed before the application of other temporary erosion control or soil stabilization materials in the same area.

When no longer required, as determined by the Engineer, temporary fiber rolls shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. Temporary fiber rolls may be abandoned in place when approved in writing by the Engineer.

Ground disturbances including holes and depressions caused by the installation and removal of the temporary fiber roll shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MAINTENANCE

Temporary fiber rolls shall be maintained to disperse concentrated water runoff and to reduce runoff velocities. Split, torn, or unraveling rolls shall be repaired or replaced. Broken or split stakes shall be replaced. Sagging or slumping fiber rolls shall be repaired with additional stakes or replaced. Locations where rills and other evidence of concentrated runoff have occurred beneath the rolls shall be corrected. Temporary fiber rolls shall be repaired or replaced within 24 hours of identifying the deficiency.

MEASUREMENT AND PAYMENT

Quantities of temporary fiber rolls to be paid for will be determined by the meter measured along the centerline of the installed roll. Where temporary fiber rolls are joined and overlapped, the overlap will be measured as a single installed roll.

The contract price paid per meter for temporary fiber roll shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing temporary fiber rolls, complete in place, including furrow excavation and backfill, and removal, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Damage to temporary fiber rolls resulting from the Contractor's vehicles, equipment, or operations shall be repaired at the Contractor's expense.

The cost of maintaining temporary fiber rolls will be borne equally by the State and the Contractor. The division of cost will be made by determining the cost of maintaining temporary fiber rolls in conformance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications and paying half of that cost to the Contractor.

Cleanup, repair, removal, disposal, or replacement due to improper installation or the Contractor's negligence will not be considered as included in the cost for performing maintenance.

10-1.10 TEMPORARY SILT FENCE

Temporary silt fence shall be furnished, installed, maintained, and later removed at the locations shown on the approved Storm Water Pollution Prevention Plan (SWPPP) in conformance with "Water Pollution Control" of these special provisions, and in conformance with details shown on the plans and these special provisions.

Temporary silt fence shall be one of the water pollution control practices for sediment control. The SWPPP shall include the use of temporary silt fence.

MATERIALS

Temporary silt fence shall either be prefabricated or constructed with silt fence fabric, posts, and fasteners.

Silt Fence Fabric

Silt fence fabric shall be geotextile manufactured from woven polypropylene or polymer material. Silt fence fabric may be virgin, recycled, or a combination of virgin and recycled polymer materials. No virgin or recycled polymer materials shall contain biodegradable filler materials that can degrade the physical or chemical characteristics of the finished fabric. The Engineer may order tests to confirm the absence of biodegradable filler materials in conformance

to the requirements in ASTM Designation: E 204 (Fourier Transformed Infrared Spectroscopy-FTIR).

Silt fence fabric shall conform to the following requirements:

Specification	Requirements
Width, mm, min.	900
Grab tensile strength (25-mm grip), kilonewtons, min. in each direction ASTM Designation: D 4632*	0.55
Elongation, percent minimum in each direction ASTM Designation: D 4632*	15
Permittivity, 1/sec., min. ASTM Designation: D 4491	0.05
Flow rate, liters per minute per square meter, min. ASTM Designation: D 4491	400
Ultraviolet stability, percent tensile strength retained after 500 hours, min. ASTM Designation: D 4355 (xenon-arc lamp and water spray weathering method)	70

* or appropriate test method for specific polymer

Posts

Posts for temporary silt fence shall be one of the following:

1. Untreated fir or pine, a minimum of 34 mm x 40 mm in size, and 1.2 m in length. One end of the post shall be pointed.
2. Steel and have a "U," "T," "L," or other cross sectional shape that can resist failure from lateral loads. The steel posts shall have a minimum mass per length of 1.1 kg/m and a minimum length of 1.2 m. One end of the steel posts shall be pointed and the other end shall be capped with an orange or red plastic safety cap which fits snugly to the steel post. The Contractor shall submit to the Engineer for approval a sample of the capped steel post before installation.

Fasteners

Fasteners for attaching silt fence fabric to posts shall be as follows:

1. When prefabricated silt fence is used, posts shall be inserted into sewn pockets.
2. Silt fence fabric shall be attached to wooden posts with nails or staples as shown on the plans or as recommended by the manufacturer or supplier. Tie wire or locking plastic fasteners shall be used to fasten the silt fence fabric to steel posts. Maximum spacing of fasteners shall be 200 mm along the length of the steel post.

INSTALLATION

Temporary silt fence shall be installed parallel with the slope contour in reaches not to exceed 150 m. A reach is considered a continuous run of temporary silt fence from end to end or from an end to an opening, including joined panels. Each reach shall be constructed so that the elevation at the base of the fence does not deviate from the contour more than 1/3 of the fence height.

The silt fence fabric shall be installed on the side of the posts facing the slope. The silt fence fabric shall be anchored in a trench as shown on the plans. The trench shall be backfilled and mechanically or hand tamped to secure the silt fence fabric in the bottom of the trench.

Mechanically pushing 300 mm of the silt fence fabric vertically through the soil may be allowed if the Contractor can demonstrate to the Engineer that the silt fence fabric will not be damaged and will not slip out of the soil resulting in sediment passing under the silt fence fabric.

The maximum post spacing may be increased to 3 m if the fence is reinforced by a wire or plastic material by prefabrication or by field installation. The field-assembled reinforced temporary silt fence shall be able to retain saturated sediment without collapsing.

Temporary silt fence shall be joined as shown on the plans. The tops of the posts shall be tied together by minimum of 2 wraps of tie wire of a minimum 1.5-mm diameter. The silt fence fabric shall be attached to the posts at the joint as specified in these special provisions.

When no longer required as determined by the Engineer, temporary silt fence shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications. Trimming the silt fence fabric and leaving it in place will not be allowed.

Ground disturbance, including holes and depressions, caused by the installation and removal of the temporary silt fence shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MAINTENANCE

Temporary silt fence shall be maintained to provide a sediment holding capacity of approximately 1/3 the height of the silt fence fabric above ground. When sediment exceeds this height or when directed by the Engineer, sediment shall be removed. The removed sediment shall be deposited within the project limits so that the sediment is not subject to erosion by wind or by water.

Temporary silt fence shall be repaired or replaced the same day the damage occurs. Damage to the temporary silt fence resulting from the Contractor's vehicles, equipment, or operations shall be repaired at the Contractor's expense.

MEASUREMENT AND PAYMENT

Quantities of temporary silt fence to be paid for will be determined by the meter, measured parallel with the ground slope along the line of the installed temporary silt fence, deducting the widths of openings.

The contract price paid per meter for temporary silt fence shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing temporary silt fence, complete in place, including trench excavation and backfill, maintenance, and removal, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.11 TEMPORARY FENCE

Temporary fence shall be furnished, constructed, maintained, and later removed as shown on the plans, as specified in these special provisions and as directed by the Engineer.

Except as otherwise specified in this section, temporary fence shall conform to the plan details and the specifications for permanent fence of similar character as provided in Section 80, "Fences," of the Standard Specifications.

Used materials may be installed provided the used materials are good, sound and are suitable for the purpose intended, as determined by the Engineer.

Materials may be commercial quality provided the dimensions and sizes of the materials are equal to, or greater than, the dimensions and sizes shown on the plans or specified herein.

Posts shall be either metal or wood at the Contractor's option.

Galvanizing and painting of steel items will not be required.

Treating wood with a wood preservative will not be required.

Concrete footings for metal posts will not be required.

Temporary fence that is damaged during the progress of the work shall be repaired or replaced by the Contractor at the Contractor's expense.

When no longer required for the work, as determined by the Engineer, temporary fence shall be removed. Removed facilities shall become the property of the Contractor and shall be removed from the site of the work, except as otherwise provided in this section.

Removed temporary fence materials that are not damaged may be constructed in the permanent work provided the materials conform to the requirements specified for the permanent work and such materials are new when used for the temporary fence.

Holes caused by the removal of temporary fence shall be backfilled in conformance with the provisions in the second paragraph of Section 15-1.02, "Preservation of Property," of the Standard Specifications.

The various types and kinds of temporary fence will be measured and paid for in the same manner specified for permanent fence of similar character as provided in Section 80, "Fences," of the Standard Specifications.

Full compensation for maintaining, removing, and disposing of temporary fence shall be considered as included in the contract prices paid per meter for the various types of temporary fence and no additional compensation will be allowed therefor.

10-1.12 TEMPORARY GRAVEL BAG BERM

Temporary gravel bag berms shall be furnished, installed, maintained, and later removed at the locations shown on the approved Storm Water Pollution Prevention Plan in conformance with "Water Pollution Control" of these special provisions, and in conformance with details shown on the plans and these special provisions.

Temporary gravel bag berms shall be one of the water pollution control practices for sediment control. The Storm Water Pollution Prevention Plan shall include the use of temporary gravel bag berms.

MATERIALS

Gravel-filled Bags

Gravel bag fabric shall be nonwoven polypropylene geotextile (or comparable polymer) and shall conform to the following requirements:

Specification	Requirements
Mass per unit area, grams per square meter, min. ASTM Designation: D 5261	270
Grab tensile strength (25-mm grip), kilonewtons, min. ASTM Designation: D4632*	0.89
Ultraviolet stability, percent tensile strength retained after 500 hours, ASTM Designation: D4355, xenon arc lamp method	70

* or appropriate test method for specific polymer

Gravel bags shall be between 600 mm and 800 mm in length, and between 400 mm and 500 mm in width.

Yarn used for binding gravel bags shall be as recommended by the manufacturer or bag supplier and shall be of a contrasting color.

Gravel shall be between 10 mm and 20 mm in diameter, and shall be clean and free from clay balls, organic matter, and other deleterious materials. The opening of gravel-filled bags shall be secured to prevent gravel from escaping. Gravel-filled bags shall be between 13 kg and 22 kg in mass.

INSTALLATION

Temporary gravel bag berms shall be installed as follows:

- A. A single layer of gravel bags shall be placed with ends abutted tightly and not overlapped.
- B. The bedding area for the temporary gravel bag berm shall be cleared of obstructions, including rocks, clods, and debris greater than 25 mm in diameter, prior to installation.
- C. Temporary gravel bag berms shall be installed approximately parallel to the slope contour.
- D. The last 2 m of the temporary gravel bag berm shall be angled up-slope.

When no longer required, as determined by the Engineer, temporary gravel bag berm shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Ground disturbance, including holes and depressions, caused by the installation and removal of the temporary gravel bag berm shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MAINTENANCE

Temporary gravel bag berms shall be maintained to provide a sediment holding capacity of approximately 1/3 the height of the gravel bag berm above the ground. When sediment exceeds this height, or when directed by the Engineer, sediment shall be removed. Removed sediment shall be deposited within the project limits in such a way that the sediment is not subject to erosion by wind or by water.

Temporary gravel bag berms shall be repaired or replaced on the same day the damage occurs. Damage to the temporary gravel bag berm resulting from the Contractor's vehicles, equipment, or operations shall be repaired at the Contractor's expense.

Gravel bags shall be replaced when the bag material is ruptured or when the yarn has failed, allowing the bag contents to spill out.

MEASUREMENT AND PAYMENT

Quantities of temporary gravel bag berm to be paid for will be determined by the meter, measured along the centerline of the installed temporary gravel bag berm.

The contract price paid per meter for temporary gravel bag berm shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing temporary gravel bag berm, complete in place, including backfill, maintenance, and removal, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.13 TEMPORARY CONSTRUCTION ENTRANCE

Temporary construction entrances shall be constructed, maintained, and later removed at the locations shown on the approved Storm Water Pollution Prevention Plan (SWPPP) in conformance with "Water Pollution Control" of these special provisions, and in conformance with details shown on the plans and these special provisions.

Temporary construction entrances shall be one of the water pollution control practices for tracking control. The SWPPP shall include the use of temporary construction entrances.

Temporary construction entrances shall be either Type 1 or Type 2.

MATERIALS

Temporary Entrance Fabric

Temporary entrance fabric shall be manufactured from polyester, nylon, or polypropylene material, or any combination thereof. Temporary entrance fabric shall be a nonwoven, needle-punched fabric, free of needles which may have broken off during the manufacturing process. Temporary entrance fabric shall be permeable and shall not act as a wicking agent.

Temporary entrance fabric shall be manufactured from virgin, recycled, or a combination of virgin and recycled polymer materials. No virgin or recycled materials shall contain biodegradable filler materials that can degrade the physical or chemical characteristics of the finished fabric. The Engineer may order tests to confirm the absence of biodegradable filler materials in conformance to the requirements in ASTM Designation: E 204 (Fourier Transformed Infrared Spectroscopy-FTIR).

Temporary entrance fabric shall conform to the following requirements:

Specification	Requirements
Mass per unit area, grams per square meter, min. ASTM Designation: D 5261	235
Grab tensile strength (25-mm grip), kilonewtons, min. ASTM Designation: D4632*	0.89
Elongation at break, percent min. ASTM Designation: D4632*	50
Toughness, kilonewtons, min. (percent elongation x grab tensile strength)	53

* or appropriate test method for specific polymer

Rocks

Rocks shall conform to the material quality requirements in Section 72-2.02, "Materials," of the Standard Specifications for shape and for apparent specific gravity, absorption, and durability index. Rocks used for the temporary entrance shall conform to the following sizes:

Square Screen Size (mm)	Percentage Passing	Percentage Retained
150	100	0
75	0	100

Corrugated Steel Panels

Corrugated steel panels shall be prefabricated and shall be pressed or shop welded, with a slot or hooked section to facilitate coupling at the ends of the panels.

INSTALLATION

Temporary construction entrances shall be installed as follows:

1. Before placing the temporary entrance fabric, the areas shall be cleared of all trash and debris. Vegetation shall be removed to the ground level. Trash, debris, and removed vegetation shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.
2. A sump shall be constructed within 6 m of each temporary construction entrance as shown on the plans.
3. Before placing the temporary entrance fabric, the ground shall be graded to a uniform plane. The relative compaction of the top 0.5-m shall be not less than 90 percent. The ground surface shall be free of sharp objects that may damage the temporary entrance fabric, and shall be graded to drain to the sump as shown on the plans.
4. Temporary entrance fabric shall be positioned longitudinally along the alignment of the entrance, as directed by the Engineer.
5. The adjacent ends of the fabric shall be overlapped a minimum length of 300 mm.
6. Rocks to be placed directly over the fabric shall be spread in the direction of traffic, longitudinally and along the alignment of the temporary construction entrance.
7. During spreading of the rocks, vehicles or equipment shall not be driven directly on the fabric. A layer of rocks a minimum 150 mm thick shall be placed between the fabric and the spreading equipment to prevent damage to the fabric.
8. For Type 2 temporary construction entrances, a minimum of 6 coupled panel sections shall be installed for each temporary construction entrance. Before installing the panels, the ground surface shall be cleared of all debris to ensure uniform contact with the ground surface.

Fabric damaged during rock placement shall be repaired by placing a new piece of fabric over the damaged area. The piece of fabric shall be large enough to cover the damaged area and provide a minimum 450-mm overlap on all edges.

Details for a proposed alternative temporary construction entrance or alternative sump shall be submitted to the Engineer for approval at least 7 days before installation. The Contractor may eliminate the sump if approved in writing by the Engineer.

When no longer required as determined by the Engineer, temporary construction entrances shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Ground disturbance, including holes and depressions, caused by the installation and removal of the temporary construction entrance, including the sumps, shall be backfilled and repaired in conformance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

While the temporary construction entrance is in use, pavement shall be cleaned and sediment removed at least once a day, and as often as necessary when directed by the Engineer. Soil and sediment or other extraneous material tracked onto existing pavement shall not be allowed to enter drainage facilities.

MAINTENANCE

The Contractor shall maintain temporary construction entrances throughout the contract or until removed. The Contractor shall prevent displacement or migration of the rock surfacing or

corrugated steel panels. Significant depressions resulting from settlement or heavy equipment shall be repaired by the Contractor, as directed by the Engineer.

Temporary construction entrances shall be maintained to minimize tracking of soil and sediment onto existing public roads.

If buildup of soil and sediment deter the function of the temporary construction entrance, the Contractor shall immediately remove and dispose of the soil and sediment, and install additional corrugated steel panels and spread additional rocks to increase the capacity of the temporary construction entrance.

Temporary construction entrances shall be repaired or replaced on the same day the damage occurs. Damage to the temporary construction entrance resulting from the Contractor's vehicles, equipment, or operations shall be repaired at the Contractor's expense.

MEASUREMENT AND PAYMENT

Quantities of temporary construction entrances will be determined from actual count in place.

The contract unit price paid for temporary construction entrance shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing temporary construction entrance, complete in place, including excavation and backfill, and removal, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The cost of maintaining the temporary construction entrance will be borne equally by the State and the Contractor. The division of cost will be made by determining the cost of maintaining temporary construction entrance in conformance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications and paying to the Contractor one-half of that cost.

Cleanup, repair, removal, disposal, or replacement due to improper installation or the Contractor's negligence will not be considered as included in the cost for performing maintenance.

10-1.14 TEMPORARY DRAINAGE INLET PROTECTION

Temporary drainage inlet protection shall be constructed, maintained, and removed at the locations shown on the approved Storm Water Pollution Prevention Plan (SWPPP) in accordance with "Water Pollution Control" of these special provisions, and in accordance with the details shown on the plans and these special provisions.

Temporary drainage inlet protection shall be one of the water pollution control practices for sediment control. The SWPPP shall include the use of temporary drainage inlet protection.

The Contractor shall select the appropriate drainage inlet protection in accordance with the details to meet the conditions around the drainage inlet. Throughout the duration of the contract, the Contractor shall provide protection to meet the changing conditions around the drainage inlet.

Temporary drainage inlet protection shall be Type 2, Type 3A or Type 4B as indicated per project plans.

MATERIALS

Erosion Control Blanket

The erosion control blanket shall be a rolled erosion control product (RECP) and shall be classified either as temporary and degradable or long-term and nondegradable, and shall conform to one of the following:

A. Temporary and degradable:

1. Machine produced mats consisting of curled wood excelsior with 80 percent of the fiber 150 mm or longer. The excelsior blanket shall be of consistent thickness with wood fiber evenly distributed over the entire area of the blanket. The top surface of the blanket shall be covered with extruded photodegradable plastic netting or lightweight nonsynthetic netting. The blanket shall be smolder resistant without the use of chemical additives and shall be nontoxic and noninjurious to plant and animal life. The excelsior blanket shall be furnished in rolled strips with a minimum mass per unit area of 0.40-kg/m^2 .
2. Machine produced mats consisting of 70 percent straw and 30 percent coconut fiber with extruded photodegradable plastic netting or lightweight nonsynthetic netting on the top and bottom surfaces of the blanket. The straw and coconut shall adhere to the netting using thread or glue strip. The straw and coconut blanket shall be of consistent thickness, and straw and coconut fiber shall be evenly distributed over the entire area of the blanket. The straw and coconut fiber blanket shall be furnished in rolled strips with a minimum mass per unit area of 0.27-kg/m^2 .
3. Machine produced mats that are 100 percent coir consisting of coconut fiber with extruded photodegradable plastic netting or lightweight nonsynthetic netting on the top and bottom surfaces of the blanket. The coconut fiber shall adhere to the netting using thread or glue strip. The coconut blanket shall be of consistent thickness, with coconut fiber evenly distributed over the entire area of the blanket. The coconut fiber blanket shall be furnished in rolled strips with a minimum mass per unit area of 0.27-kg/m^2 .
4. Machine woven netting that is 100 percent spun coir consisting of coconut fiber with an average open area of 63 percent to 70 percent. Coconut coir netting shall be furnished in rolled strips with a minimum mass per unit area of 0.40-kg/m^2 .

B. Long-term and nondegradable:

1. Geotextile blanket shall conform to the provisions for rock slope protection fabric (Type A) in Section 88-1.04, "Rock Slope Protection Fabric," of the Standard Specifications.

Staples

Staples shall be as shown on the plans. An alternative attachment device such as geotextile pins or plastic pegs may be used instead of staples. The Contractor shall submit a sample of the alternative attachment device for the Engineer's approval before installation.

Rocks

Rocks shall conform to the requirements in Section 72-2.02, "Materials," of the Standard Specifications except that grading shall conform to the following sizes:

Square Screen Size (mm)	Percentage Passing	Percentage Retained
150	100	0
75	0	100

Gravel-filled Bags

Gravel-filled bag fabric shall be nonwoven polypropylene geotextile or polymer material and shall conform to the following requirements:

Specification	Requirements
Mass per unit area, grams per square meter, minimum. ASTM Designation: D 5261	270
Grab tensile strength (25-mm grip), kilonewtons, minimum. ASTM Designation: D4632*	0.89
Ultraviolet stability, percent tensile strength retained after 500 hours, ASTM Designation: D4355, xenon arc lamp method	70

* or appropriate test method for specific polymer

Gravel-filled bags shall be between 600 mm and 800 mm in length, and between 400 mm and 500 mm in width.

Yarn used for binding gravel bags shall be as recommended by the manufacturer or bag supplier and shall be of a contrasting color.

Gravel shall be between 10 mm and 20 mm in diameter, and shall be clean and free from clay balls, organic matter, and other deleterious materials. The opening of gravel-filled bags shall be secured to prevent gravel from escaping. Gravel-filled bags shall be between 13 kg and 22 kg in mass.

Silt Fence

At the Contractor's option, temporary silt fence shall be prefabricated or constructed with silt fence fabric, posts, and fasteners.

Silt fence fabric shall conform to the following requirements:

Specification	Requirements
Width, mm, min.	900
Grab tensile strength (25-mm grip), kilonewtons, minimum. in each direction ASTM Designation: D 4632 or appropriate test method for specific polymer	0.55
Elongation, percent minimum in each direction ASTM Designation: D 4632 or appropriate test method for specific polymer	15
Permittivity, l/sec., minimum. ASTM Designation: D 4491	1.5
Flow rate, liters per minute per square meter, minimum. ASTM Designation: D 4491	400
Ultraviolet stability, percent tensile strength retained after 500 hours, minimum. ASTM Designation: D 4355 (xenon-arc lamp and water spray weathering method)	70

Silt fence fabric shall be geotextile manufactured from woven polypropylene or polymer material. Silt fence fabric may be made of recycled materials. No materials shall contain biodegradable filler materials that can degrade the physical or chemical characteristics of the finished fabric. The Engineer may order tests to confirm the absence of biodegradable filler materials in conformance to the requirements in ASTM Designation: E 204.

Posts for temporary silt fences shall be one of the following:

- A. Posts shall be untreated fir, redwood, cedar, or pine, shall be cut from sound timber, and shall be straight and free of loose or unsound knots and other defects which would render

- them unfit for the purpose intended. Wood post shall be a minimum of 34 mm x 40 mm in size, and 4 feet in length. The end of the post to be embedded in the soil shall be pointed.
- B. Posts shall be steel and have a "U," "T," "L," or other cross sectional shape that can resist failure from lateral loads. The steel posts shall have a minimum mass per length of 1.1 kg/m and a minimum length of 1.2 m. One end of the steel posts shall be pointed and the other end shall be capped with an orange or red plastic safety cap which fits snugly to the steel post. The Contractor shall submit to the Engineer for approval a sample of the capped steel post before installation.

Fasteners for attaching silt fence fabric to posts shall be as follows:

- A. When prefabricated silt fence is used, posts shall be inserted into sewn pockets.
- B. Silt fence fabric shall be attached to wooden posts with nails or staples as shown on the plans or as recommended by the manufacturer or supplier. Tie wire or locking plastic fasteners shall be used to fasten the silt fence fabric to steel posts. Maximum spacing of fasteners shall be 200 mm along the length of the steel post.

Foam Barriers

The foam barrier fabric cover and skirt shall be a woven polypropylene fabric with a minimum tensile strength of 0.44-kN, conforming to ASTM Designation: D 4632. The prefabricated fabric shall be high visibility orange in color that is integral to the fabric; painting shall not be allowed. The fabric shall have an ultraviolet stability exceeding 70 percent.

The foam core shall be urethane foam and shall be shaped and dimensioned as shown on the plans.

Adhesive for foam barriers shall be a solvent-free rubber modified asphalt emulsion. The color of the emulsion shall be brown when wet and shall have a drying period of not more than 3 hours.

Anchoring nails or spikes for foam barriers shall be a minimum of 25 mm in length and capable of penetrating concrete or asphalt surfaces.

INSTALLATION

Temporary drainage inlet protection shall be installed at drainage inlets in paved and unpaved areas as follows:

- A. Temporary drainage inlet protection shall be installed such that ponded runoff does not encroach on the traveled way or overtop the curb or dike. Gravel-filled bags shall be placed to control ponding and prevent runoff from overtopping the curb or dike.
- B. The bedding area for the temporary drainage inlet protection shall be cleared of obstructions including rocks, clods, and debris greater than 25 mm in diameter before installation.
- C. A temporary linear sediment barrier shall be installed up-slope of the existing drainage inlet and parallel with the curb, dike, or flow line to prevent sediment from entering the drainage inlet.

Erosion Control Blanket and Geotextile Fabric

The erosion control blanket and geotextile fabric shall be secured to the surface of the excavated sediment trap with staples and embedded in a trench adjacent to the drainage inlet. The perimeter edge of the erosion control blanket and geotextile fabric shall be anchored in a trench.

Silt Fence

Silt fence shall be installed along the perimeter of the erosion control blanket or geotextile fabric, with the posts facing the drainage inlet. The trench shall be backfilled and tamped to secure the silt fence fabric in the bottom of the trench.

Gravel-filled Bags

Gravel-filled bags shall be stacked to form a gravel bag barrier. The gravel-filled bags shall be placed so that the bags are tightly abutted and overlap the joints in adjacent rows. A spillway shall be created by removing one or more gravel-filled bags from the upper layer of the gravel bag barrier.

Gravel-filled bags shall only be used within shoulder areas when placed behind temporary railing (Type K).

Foam Barriers

Foam barriers shall be installed in individual sections adjacent to existing drainage inlets. Foam barriers shall be securely attached to the pavement according to the angle and spacing shown on the plans. Foam barriers shall be installed flush against the sides of concrete, asphalt concrete, or hot mix asphalt curbs, dikes, and pavement with the inner material and fabric cover cut smoothly and evenly to provide a tight flush joint.

MAINTENANCE

Temporary drainage inlet protection shall be maintained to provide sediment holding capacity and to reduce runoff velocities. Temporary drainage inlet protection shall be repaired or replaced immediately after the damage occurs.

Sediment deposits, trash, and debris shall be removed from temporary drainage inlet protection as needed or when directed by the Engineer. Removed sediment shall be deposited within the project limits so that the sediment is not subject to erosion by wind or by water. Trash and debris shall be removed and disposed of in accordance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

At locations where rills and other evidence of concentrated runoff have occurred beneath the drainage inlet protection, the protection shall be adjusted to prevent another occurrence.

Temporary silt fence shall be repaired or replaced when silt fence fabric becomes split, torn, or unraveled. Sagging or slumping silt fence shall be repaired with additional stakes or replaced. Broken or split stakes shall be replaced. Temporary silt fence shall be maintained to provide a sediment holding capacity of approximately 1/3 the height of the silt fence fabric above ground.

Sediment shall be removed from the sediment trap when the volume has been reduced by approximately one-half.

Sediment deposits shall be removed when the deposit is 1/3 the height of the gravel bag barrier or one half the height of the spillway; whichever is less.

Gravel-filled bags shall be replaced when the bag material ruptures or when the binding fails.

Foam barriers shall be repaired or replaced when the geotextile fabric cover becomes split, torn, or unraveled. Foam barriers that become detached or dislodged shall be reattached to the pavement. Sediment deposits shall be removed when the deposit reaches 1/3 of the foam barrier height.

REMOVAL

When the temporary drainage inlet protection is no longer required the protection materials shall be removed and disposed of in accordance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Holes, depressions, or other ground disturbance caused by the removal of the temporary drainage inlet protection shall be backfilled and repaired in accordance with the provisions in Section 15-1.02, "Preservation of Property," of the Standard Specifications.

MEASUREMENT

Quantities of temporary drainage inlet protection will be determined from actual count in place. The protection will be measured one time only and no additional measurement will be recognized.

PAYMENT

The contract unit price paid for temporary drainage inlet protection shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the temporary drainage inlet protection, complete in place, including removal of materials, including cleanup and disposal of retained sediment and debris, and backfilling and repairing holes, depressions and other ground disturbance, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

No additional compensation will be made if the temporary drainage inlet protection changes during the course of construction.

The cost of maintaining temporary drainage inlet protection will be borne equally by the State and the Contractor. The division of cost will be made by determining the cost of maintaining temporary drainage inlet protection in accordance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications and paying to the Contractor one-half of that cost.

Cleanup, repair, removal, disposal, or replacement due to improper installation, or as a result of the Contractor's negligence will not be considered as included in the cost for performing maintenance.

10-1.15 COOPERATION

It is anticipated that work by another contractor may be in progress adjacent to or within the limits of this project during progress of the work on this contract. The following table lists contracts anticipated to be in progress during this contract.

Contract No.	Co-Rte-KP	Location	Type of Work
08-007171	SBd-215-10.4	I-215 from Orange Show Rd to Mill Street	Freeway Widening and Interchange Reconstruction
08-4440U4	SBd-215-14.4 SBD-210-36.7	I-215 from Massachusetts Ave to University Parkway I-210 from Miramonte Drive to Highland Avenue	Freeway Widening and Interchange Reconstruction

Comply with Section 7-1.14, "Cooperation," of the Standard Specifications.

10-1.16 PROGRESS SCHEDULE (CRITICAL PATH METHOD)

GENERAL

Summary

Critical path method (CPM) progress schedules are required for this project. Whenever the term "schedule" is used in this section, it means CPM progress schedule.

The provisions in Section 8-1.04, "Progress Schedule," of the Standard Specifications do not apply.

Definitions

The following definitions apply to this section:

activity: A task, event or other project element on a schedule that contributes to completing the project. Activities have a description, start date, finish date, duration and one or more logic ties.

baseline schedule: The initial schedule showing the original work plan beginning on the date of contract approval. This schedule shows no completed work to date and no negative float or negative lag to any activity.

contract completion date: The current extended date for completion of the contract shown on the weekly statement of working days furnished by the Engineer as specified in Section 8-1.06, "Time of Completion," of the Standard Specifications.

critical path: The longest continuous chain of activities for the project that has the least amount of total float of all chains. In general, a delay on the critical path will extend the scheduled completion date.

critical path method (CPM): A network based planning technique using activity durations and the relationships between activities to mathematically calculate a schedule for the entire project.

data date: The day after the date through which a schedule is current. Everything occurring earlier than the data date is "as-built" and everything on or after the data date is "planned."

early completion time: The difference in time between an early scheduled completion date and the contract completion date.

float: The difference between the earliest and latest allowable start or finish times for an activity.

milestone: An event activity that has zero duration and is typically used to represent the beginning or end of a certain stage of the project.

narrative report: A document submitted with each schedule that discusses topics related to project progress and scheduling.

near critical path: A chain of activities with total float exceeding that of the critical path but having no more than 10 working days of total float.

scheduled completion date: The planned project finish date shown on the current accepted schedule.

State owned float activity: The activity documenting time saved on the critical path by actions of the State. It is the last activity prior to the scheduled completion date.

time impact analysis: A schedule and narrative report developed specifically to demonstrate what effect a proposed change or delay has on the current scheduled completion date.

time-scaled network diagram: A graphic depiction of a CPM schedule comprised of activity bars with relationships for each activity represented by arrows. The tail of each arrow connects to the activity bar for the predecessor and points to the successor.

total float: The amount of time that an activity or chain of activities can be delayed before extending the scheduled completion date.

updated schedule: A current schedule developed from the baseline or subsequent schedule through regular monthly review to incorporate as-built progress and any planned changes.

Submittals

General Requirements

Submit to the Engineer baseline, monthly updated, and final updated schedules, each consistent in all respects with the time and order of work requirements of the contract. Work must be executed in the sequence indicated on the current accepted schedule.

Schedules must show the order in which you propose to prosecute the work with logical links between time-scaled work activities and calculations made using the critical path method to determine the controlling activities. You are responsible for assuring that all activity sequences are logical and that each schedule shows a coordinated plan for complete performance of the work.

Produce schedules using computer software and submit compatible software for the Engineer's exclusive possession and use. Submit network diagrams and schedule data as parts of each schedule submittal.

Schedule activities must include the following:

1. Project characteristics, salient features, or interfaces, including those with outside entities, that could affect time of completion
2. Project start date, scheduled completion date, and other milestones
3. Work performed by you, your subcontractors, and suppliers
4. Submittal development, delivery, review, and approval, including those from you, your subcontractors, and suppliers
5. Procurement, delivery, installation, and testing of materials, plants, and equipment
6. Testing and settlement periods
7. Utility notification and relocation
8. Erection and removal of falsework and shoring
9. Major traffic stage switches
10. Finishing roadway and final cleanup
11. State-owned float as the predecessor activity to the scheduled completion date

Schedules must have not less than 50 and not more than 500 activities, unless otherwise authorized by the Engineer. The number of activities must be sufficient to assure adequate

planning of the project, to permit monitoring and evaluation of progress, and to do an analysis of time impacts.

Schedule activities must include the following:

1. A clear and legible description.
2. Start and finish dates.
3. A duration of not less than one working day, except for event activities, and not more than 20 working days, unless otherwise authorized by the Engineer.
4. At least one predecessor and one successor activity, except for project start and finish milestones.
5. Required constraints. Constraints other than those required by the special provisions may be included only if authorized by the Engineer.
6. Codes for responsibility, stage, work shifts, location, and contract pay item numbers.

You may show early completion time on any schedule provided that the requirements of the contract are met. Early completion time is considered a resource for your exclusive use. You may increase early completion time by improving production, reallocating resources to be more efficient, performing sequential activities concurrently, or by completing activities earlier than planned. You may also submit for approval a cost reduction incentive proposal as specified in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications that will reduce time of construction.

You may show a scheduled completion date that is later than the contract completion date on an update schedule, after the baseline schedule is accepted. Provide an explanation for a late scheduled completion date in the narrative report that is included with the schedule.

State-owned float is considered a resource for the exclusive use of the State. The Engineer may accrue State-owned float by the early completion of review of any type of required submittal when it saves time on the critical path. Prepare a time impact analysis, when requested by the Engineer, to determine the effect of the action as specified in "Time Impact Analysis." The Engineer documents State-owned float by directing you to update the State-owned float activity on the next updated schedule. Include a log of the action on the State-owned float activity and include a discussion of the action in the narrative report. The Engineer may use State-owned float to mitigate past, present, or future State delays by offsetting potential time extensions for contract change orders.

The Engineer may adjust contract working days for ordered changes that affect the scheduled completion date as specified in Section 4-1.03, "Changes," of the Standard Specifications. Prepare a time impact analysis to determine the effect of the change as specified in "Time Impact Analysis" and include the impacts acceptable to the Engineer in the next updated schedule. Changes that do not affect the controlling operation on the critical path will not be considered as the basis for a time adjustment. Changes that do affect the controlling operation on the critical path will be considered by the Engineer in decreasing time or granting an extension of time for completion of the contract. Time extensions will only be granted if the total float is absorbed and the scheduled completion date is delayed one or more working days because of the ordered change.

The Engineer's review and acceptance of schedules does not waive any contract requirements and does not relieve you of any obligation or responsibility for submitting complete and accurate information. Correct rejected schedules and resubmit corrected schedules to the Engineer within 7 days of notification by the Engineer, at which time a new review period of 7 days will begin.

Errors or omissions on schedules do not relieve you from finishing all work within the time limit specified for completion of the contract. If, after a schedule has been accepted by the

Engineer, either you or the Engineer discover that any aspect of the schedule has an error or omission, you must correct it on the next updated schedule.

Computer Software

Submit to the Engineer for review a description of proposed schedule software to be used. After the Engineer accepts the proposed software, submit schedule software and all original software instruction manuals. All software must be compatible with the current version of the Windows operating system in use by the Engineer. The schedule software must include:

1. Latest version of Primavera SureTrak Project Manager for Windows, or equivalent
2. Latest version of schedule-comparing HST SureChange, or equivalent

If a schedule software equivalent to SureTrak is proposed, it must be capable of generating files that can be imported into SureTrak. The schedule-comparing software must be compatible with schedule software submitted and must be able to compare two schedules and provide reports of changes in activity ID, activity description, constraints, calendar assignments, durations, and logic ties.

The schedule software and schedule-comparing software will be returned to you before the final estimate. The Department will compensate you as specified in Section 4-1.03, "Extra Work," of the Standard Specifications for replacement of software or manuals damaged, lost, or stolen after delivery to the Engineer.

Instruct the Engineer in the use of the software and provide software support until the contract is accepted. Within 15 days of contract approval, provide a commercial 8-hour training session for 2 Department employees in the use of the software at a location acceptable to the Engineer. It is recommended that you also send at least 2 employees to the same training session to facilitate development of similar knowledge and skills in the use of the software. If schedule software other than SureTrak is submitted, then the training session must be a total of 16-hours for each Department employee.

Network Diagrams, Reports, and Data

Include the following with each schedule submittal:

1. Two sets of originally plotted, time-scaled network diagrams
2. Two copies of a narrative report
3. One read-only compact disk or floppy diskette containing the schedule data

The time-scaled network diagrams must conform to the following:

1. Show a continuous flow of information from left to right
2. Be based on early start and early finish dates of activities
3. Clearly show the primary paths of criticality using graphical presentation
4. Be prepared on 860 mm x 1120 mm (34" x 44")
5. Include a title block and a timeline on each page

The narrative report must be organized in the following sequence with all applicable documents included:

1. Transmittal letter

2. Work completed during the period
3. Identification of unusual conditions or restrictions regarding labor, equipment or material; including multiple shifts, 6-day work weeks, specified overtime or work at times other than regular days or hours
4. Description of the current critical path
5. Changes to the critical path and scheduled completion date since the last schedule submittal
6. Description of problem areas
7. Current and anticipated delays:
 - 7.1. Cause of delay
 - 7.2. Impact of delay on other activities, milestones, and completion dates
 - 7.3. Corrective action and schedule adjustments to correct the delay
8. Pending items and status thereof:
 - 8.1. Permits
 - 8.2. Change orders
 - 8.3. Time adjustments
 - 8.4. Noncompliance notices
9. Reasons for an early or late scheduled completion date in comparison to the contract completion date

Schedule submittals will only be considered complete when all documents and data have been submitted as described above.

Preconstruction Scheduling Conference

Schedule a preconstruction scheduling conference with your project manager and the Engineer within 15 days after contract approval. The Engineer will conduct the meeting and review the requirements of this section with you.

Submit a general time-scaled logic diagram displaying the major activities and sequence of planned operations and be prepared to discuss the proposed work plan and schedule methodology that comply with the requirements of this section. If you propose deviations to the construction staging, then the general time-scaled logic diagram must also display the deviations and resulting time impacts. Be prepared to discuss the proposal.

At this meeting, also submit the alphanumeric coding structure and activity identification system for labeling work activities. To easily identify relationships, each activity description must indicate its associated scope or location of work by including such terms as quantity of material, type of work, bridge number, station to station location, side of highway (such as left, right, northbound, southbound), lane number, shoulder, ramp name, ramp line descriptor, or mainline.

The Engineer reviews the logic diagram, coding structure, and activity identification system, and provide any required baseline schedule changes to you for implementation.

Baseline Schedule

Beginning the week following the preconstruction scheduling conference, meet with the Engineer weekly to discuss schedule development and resolve schedule issues until the baseline schedule is accepted.

Submit to the Engineer a baseline schedule within 20 days of approval of the contract. Allow 20 days for the Engineer's review after the baseline schedule and all support data are submitted. In addition, the baseline schedule submittal is not considered complete until the computer software is delivered and installed for use in review of the schedule.

The baseline schedule must include the entire scope of work and how you plan to complete all work contemplated. The baseline schedule must show the activities that define the critical path. Multiple critical paths and near-critical paths must be kept to a minimum. A total of not more than 50 percent of the baseline schedule activities must be critical or near critical, unless otherwise authorized by the Engineer.

The baseline schedule must not extend beyond the number of contract working days. The baseline schedule must have a data date of contract approval. If you start work before contract approval, the baseline schedule must have a data date of the 1st day you performed work at the job site.

If you submit an early completion baseline schedule that shows contract completion in less than 85 percent of the contract working days, the baseline schedule must be supplemented with resource allocations for every task activity and include time-scaled resource histograms. The resource allocations must be shown to a level of detail that facilitates report generation based on labor crafts and equipment classes for you and your subcontractors. Use average composite crews to display the labor loading of on-site construction activities. Optimize and level labor to reflect a reasonable plan for accomplishing the work of the contract and to assure that resources are not duplicated in concurrent activities. The time-scaled resource histograms must show labor crafts and equipment classes to be used. The Engineer may review the baseline schedule activity resource allocations using Means Productivity Standards or equivalent to determine if the schedule is practicable.

Updated Schedule

Submit an updated schedule and meet with the Engineer to review contract progress, on or before the 1st day of each month, beginning one month after the baseline schedule is accepted. Allow 15 days for the Engineer's review after the updated schedule and all support data are submitted, except that the review period will not start until the previous month's required schedule is accepted. Updated schedules that are not accepted or rejected within the review period are considered accepted by the Engineer.

The updated schedule must have a data date of the 21st day of the month or other date established by the Engineer. The updated schedule must show the status of work actually completed to date and the work yet to be performed as planned. Actual activity start dates, percent complete, and finish dates must be shown as applicable. Durations for work that has been completed must be shown on the updated schedule as the work actually occurred, including Engineer submittal review and your resubmittal times.

You may include modifications such as adding or deleting activities or changing activity constraints, durations, or logic that do not (1) alter the critical path(s) or near critical path(s) or (2) extend the scheduled completion date compared to that shown on the current accepted schedule. Justify in writing the reasons for any changes to planned work. If any proposed changes in planned work will result in (1) or (2) above, then submit a time impact analysis as specified in this section.

Time Impact Analysis

Submit a written time impact analysis (TIA) to the Engineer with each request for adjustment of contract time, or when you or the Engineer considers that an approved or anticipated change may impact the critical path or contract progress.

The TIA must illustrate the impacts of each change or delay on the current scheduled completion date or internal milestone, as appropriate. The analysis must use the accepted schedule that has a data date closest to and before the event. If the Engineer determines that the accepted schedule used does not appropriately represent the conditions before the event, the accepted schedule must be updated to the day before the event being analyzed. The TIA must include an impact schedule developed from incorporating the event into the accepted schedule by adding or deleting activities, or by changing durations or logic of existing activities. If the impact schedule shows that incorporating the event modifies the critical path and scheduled completion date of the accepted schedule, the difference between scheduled completion dates of the two schedules must be equal to the adjustment of contract time. The Engineer may construct and use an appropriate project schedule or other recognized method to determine adjustments in contract time until you provide the TIA.

Submit 2 copies of your TIA within 20 days of receiving a written request for a TIA from the Engineer. Allow the Engineer 15 days after receipt to review the submitted TIA. All approved TIA schedule changes must be shown on the next updated schedule.

If a TIA you submit is rejected, meet with the Engineer to discuss and resolve issues related to the TIA. If agreement is not reached, you are allowed 15 days from the meeting with the Engineer to give notice as specified in Section 9-1.04, "Notice of Potential Claim," of the Standard Specifications. Only show actual as-built work, not unapproved changes related to the TIA, in subsequent updated schedules. If agreement is reached at a later date, approved TIA schedule changes must be shown on the next updated schedule. The Engineer withholds remaining payment on the schedule contract item if a TIA is requested and not submitted within 20 days. The schedule item payment resumes on the next estimate after the requested TIA is submitted. No other contract payment is retained regarding TIA submittals.

Final Updated Schedule

Submit a final update, as-built schedule with actual start and finish dates for the activities, within 30 days after completion of contract work. Provide a written certificate with this submittal signed by your project manager or an officer of the company stating, "To my knowledge and belief, the enclosed final update schedule reflects the actual start and finish dates of the actual activities for the project contained herein." An officer of the company may delegate in writing the authority to sign the certificate to a responsible manager.

PAYMENT

Progress schedule (critical path method) will be paid for at a lump sum price. The contract lump sum price paid for progress schedule (critical path method) includes full compensation for furnishing all labor, material, tools, equipment, and incidentals, including computer software, and for doing all the work involved in preparing, furnishing, and updating schedules, and instructing and assisting the Engineer in the use of computer software, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Payments for the progress schedule (critical path method) contract item will be made progressively as follows:

1. A total of 25 percent of the item amount or a total of 25 percent of the amount listed for progress schedule (critical path method) in "Payments" of Section 5 of these special provisions, whichever is less, will be paid upon achieving all of the following:
 - 1.1. Completion of 5 percent of all contract item work.
 - 1.2. Acceptance of all schedules and approval of all TIAs required to the time when 5 percent of all contract item work is complete.
 - 1.3. Delivery of schedule software to the Engineer.
 - 1.4. Completion of required schedule software training.
2. A total of 50 percent of the item amount or a total of 50 percent of the amount listed for progress schedule (critical path method) in "Payments" of Section 5 of these special provisions, whichever is less, will be paid upon completion of 25 percent of all contract item work and acceptance of all schedules and approval of all TIAs required to the time when 25 percent of all contract item work is complete.
3. A total of 75 percent of the item amount or a total of 75 percent of the amount listed for progress schedule (critical path method) in "Payments" of Section 5 of these special provisions, whichever is less, will be paid upon completion of 50 percent of all contract item work and acceptance of all schedules and approval of all TIAs required to the time when 50 percent of all contract item work is complete.
4. A total of 100 percent of the item amount or a total of 100 percent of the amount listed for progress schedule (critical path method) in "Payments" of Section 5 of these special provisions, whichever is less, will be paid upon completion of all contract item work, acceptance of all schedules and approval of all TIAs required to the time when all contract item work is complete, and submittal of the certified final update schedule.

If you fail to complete any of the work or provide any of the schedules required by this section, the Engineer makes an adjustment in compensation as specified in Section 4-1.03C, "Changes in Character of Work," of the Standard Specifications for the work not performed. Adjustments in compensation for schedules will not be made for any increased or decreased work ordered by the Engineer in submitting schedules.

10-1.17 MOBILIZATION

Mobilization shall conform to the provisions in Section 11, "Mobilization," of the Standard Specifications.

10-1.18 CONSTRUCTION AREA TRAFFIC CONTROL DEVICES

Flagging, signs, and temporary traffic control devices furnished, installed, maintained, and removed when no longer required shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Category 1 temporary traffic control devices are defined as small and lightweight (less than 45 kg) devices. These devices shall be certified as crashworthy by crash testing, crash testing of similar devices, or years of demonstrable safe performance. Category 1 temporary traffic control devices include traffic cones, plastic drums, portable delineators, and channelizers.

If requested by the Engineer, the Contractor shall provide written self-certification for crashworthiness of Category 1 temporary traffic control devices at least 5 days before beginning any work using the devices or within 2 days after the request if the devices are already in use. Self-certification shall be provided by the manufacturer or Contractor and shall include the following:

- A. Date,
- B. Federal Aid number (if applicable),
- C. Contract number, district, county, route and kilometer post of project limits,
- D. Company name of certifying vendor, street address, city, state and zip code,
- E. Printed name, signature and title of certifying person; and
- F. Category 1 temporary traffic control devices that will be used on the project.

The Contractor may obtain a standard form for self-certification from the Engineer.

Category 2 temporary traffic control devices are defined as small and lightweight (less than 45 kg) devices that are not expected to produce significant vehicular velocity change, but may cause potential harm to impacting vehicles. Category 2 temporary traffic control devices include barricades and portable sign supports.

Category 2 temporary traffic control devices shall be on the Federal Highway Administration's (FHWA) list of Acceptable Crashworthy Category 2 Hardware for Work Zones. This list is maintained by FHWA and can be located at:

http://safety.fhwa.dot.gov/roadway_dept/road_hardware/listing.cfm?code=workzone

The Department also maintains this list at:

<http://www.dot.ca.gov/hq/traffops/signtech/signdel/pdf/Category2.pdf>

Category 2 temporary traffic control devices that have not received FHWA acceptance shall not be used. Category 2 temporary traffic control devices in use that have received FHWA acceptance shall be labeled with the FHWA acceptance letter number and the name of the manufacturer. The label shall be readable and permanently affixed by the manufacturer. Category 2 temporary traffic control devices without a label shall not be used.

If requested by the Engineer, the Contractor shall provide a written list of Category 2 temporary traffic control devices to be used on the project at least 5 days before beginning any work using the devices or within 2 days after the request if the devices are already in use.

Category 3 temporary traffic control devices consist of temporary traffic-handling equipment and devices that weigh 45 kg or more and are expected to produce significant vehicular velocity change to impacting vehicles. Temporary traffic-handling equipment and devices include crash

cushions, truck-mounted attenuators, temporary railing, temporary barrier, and end treatments for temporary railing and barrier.

Type III barricades may be used as sign supports if the barricades have been successfully crash tested, meeting the NCHRP Report 350 criteria, as one unit with a construction area sign attached.

Category 3 temporary traffic control devices shall be shown on the plans or on the Department's Highway Safety Features list. This list is maintained by the Division of Engineering Services and can be found at:

http://www.dot.ca.gov/hq/esc/approved_products_list/HighwaySafe.htm

Category 3 temporary traffic control devices that are not shown on the plans or not listed on the Department's Highway Safety Features list shall not be used.

Full compensation for providing self-certification for crashworthiness of Category 1 temporary traffic control devices and for providing a list of Category 2 temporary traffic control devices used on the project shall be considered as included in the prices paid for the various items of work requiring the use of the Category 1 or Category 2 temporary traffic control devices and no additional compensation will be allowed therefor.

10-1.19 CONSTRUCTION AREA SIGNS

Construction area signs for temporary traffic control shall be furnished, installed, maintained, and removed when no longer required in conformance with the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Attention is directed to "Furnish Sign" of these special provisions.

Attention is directed to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. Type II retroreflective sheeting shall not be used on construction area sign panels. Type III, IV, VIII, or IX retroreflective sheeting shall be used for stationary mounted construction area sign panels.

The Contractor shall furnish and install 2 2006 State Transportation Bond Funding Identification signs at locations designated by the Engineer before starting major construction activities visible to highway users. Upon completion of the project, the Contractor shall remove and dispose of 2006 State Transportation Bond Funding Identification signs. Manufacturing details entitled SANBAG MEASURE I, FREEWAY WIDENING, COMPLETION 2013 for bond funding signs are available at:

<http://www.dot.ca.gov/hq/traffops/signtech/signdel/bondfundspecs.htm>

The Contractor shall furnish and install two 120 inch by 108 inch American Reinvestment and Recovery Act (ARRA) signs at locations designated by the Engineer before starting major construction activities visible to highway users. Upon completion of the project, the Contractor shall remove and dispose of ARRA signs. Manufacturing details for ARRA signs are available at:

<http://www.dot.ca.gov/hq/traffops/signtech/signdel/bondfundspecs.htm>

Unless otherwise shown on the plans or specified in these special provisions, the color of construction area warning and guide signs shall have black legend and border on orange background, except W10-1 or W47(CA) (Highway-Rail Grade Crossing Advance Warning) sign shall have black legend and border on yellow background.

Repair to construction area sign panels will not be allowed, except when approved by the Engineer. At nighttime under vehicular headlight illumination, sign panels that exhibit irregular luminance, shadowing or dark blotches shall be immediately replaced at the Contractor's expense.

The Contractor shall notify the appropriate regional notification center for operators of subsurface installations at least 2 business days, but not more than 14 days, prior to commencing excavation for construction area sign posts. The regional notification centers include, but are not limited to, the following:

Notification Center	Telephone Number
Underground Service Alert	811

Excavations required to install construction area signs shall be performed by hand methods without the use of power equipment, except that power equipment may be used if it is determined there are no utility facilities in the area of the proposed post holes. The post hole diameter, if backfilled with portland cement concrete, shall be at least 100 mm greater than the longer dimension of the post cross section.

Construction area signs placed within 4.6 m from the edge of the travel way shall be mounted on stationary mounted sign supports as specified in "Construction Area Traffic Control Devices" of these special provisions.

The Contractor shall maintain accurate information on construction area signs. Signs that are no longer required shall be immediately covered or removed. Signs that convey inaccurate information shall be immediately replaced or the information shall be corrected. Covers shall be replaced when they no longer cover the signs properly. The Contractor shall immediately restore to the original position and location any sign that is displaced or overturned, from any cause, during the progress of work.

PAYMENT

Full compensation for furnishing and installing 2006 State Transportation Bond Funding Identification and ARRA signs, including removal and disposal upon project completion, is included in the contract lump sum price paid for Construction Area Signs, and no separate payment will be allowed therefor.

The term "construction area signs" shall include temporary object markers required for the direction of public traffic through or around the work during construction. Object markers listed or designated on the plans as construction area signs shall be considered to be signs and shall be furnished, erected, maintained, and removed by the Contractor in the same manner specified for construction area signs.

Object markers shall be stationary mounted on wood or metal posts in conformance with the details shown on the plans and the provisions in Section 82, "Markers and Delineators," of the Standard Specifications.

Marker panels for Type N, Type P and ~~Type R~~ object markers shall conform to the provisions for sign panels for stationary mounted signs.

10-1.20 MAINTAINING TRAFFIC

Maintaining traffic shall conform to the provisions in Sections 7-1.08, "Public Convenience," Section 7-1.09, "Public Safety," and Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, "Public Safety" of these special provisions and these special provisions.

Closure is defined as the closure of a traffic lane or lanes, including shoulder, ramp or connector lanes, within a single traffic control system.

Closures shall conform to the provisions in "Traffic Control System for Lane Closure" of these special provisions.

In addition to the provisions set forth in "Public Safety" of these special provisions, whenever work, including the work of installing, maintaining, and removing temporary railing (Type K) is to be performed on the freeway within 1.8 m of the adjacent traffic lane, the adjacent traffic lane shall be closed.

Except as listed above, closure of adjacent traffic lane will not be required for installing, maintaining and removing traffic control devices.

At locations where falsework pavement lighting or pedestrian openings through falsework are designated, falsework lighting shall be installed in conformance with the provisions in Section 86-6.11, "Falsework Lighting," of the Standard Specifications.

Openings shall be provided through bridge falsework for the use of public traffic at each location where falsework is constructed over the streets or routes listed in the following table. The type, minimum width, height, and number of openings at each location, and the location and maximum spacing of falsework lighting, if required for each opening, shall conform to the requirements in the table. The width of vehicular openings shall be the clear width between temporary railings or other protective work. The spacing shown for falsework pavement lighting is the maximum distance center to center in meters between fixtures.

Rialto Avenue UC (Widen)
 Bridge No. 54-0488
 I-215 "A" Line

	Number	Width	Height
Vehicle Openings	1		
EB	1	7.32	4.6
WB		7.32	4.6
Pedestrian Openings			
EB	1	1.53	4.4
WB	1	1.53	4.4
(Alternate Use of Sidewalk Required for Footing Construction)			
	Location	Spacing	
Falsework Pavement			
Lighting			
EB	R&L	9 staggered ½ space	
WB	R&L	9 staggered ½ space	

(Width and Height in meters)

(R = Right side of traffic. L = Left side of traffic)

(C = Centered overhead)

Rialto Avenue UC
 N215 to 2nd Street Off-Ramp
 Bridge No. 54-1255S
 "2NE" Line

	Number	Width	Height
Vehicle Openings	1		
EB	1	7.32	4.6
WB		7.32	4.6
Pedestrian Openings			
EB	1	1.53	4.4
WB	1	1.53	4.4
(Alternate Use of Sidewalk Required for Footing Construction)			
	Location	Spacing	
Falsework Pavement			
Lighting			
EB	R&L	9 staggered ½ space	
WB	R&L	9 staggered ½ space	

(Width and Height in meters)

(R = Right side of traffic. L = Left side of traffic)

(C = Centered overhead)

Rialto Avenue UC
S215 to 2nd Street On-Ramp
Bridge No. 54-1256K
"2SO" Line

	Number	Width	Height
Vehicle Openings	1		
EB	1	7.32	4.6
WB		7.32	4.6
Pedestrian Openings			
EB	1	1.53	4.4
WB	1	1.53	4.4
(Alternate Use of Sidewalk Required for Footing Construction)			
	Location	Spacing	
Falsework Pavement Lighting			
EB	R&L	9 staggered ½ space	
WB	R&L	9 staggered ½ space	

(Width and Height in meters)

(R = Right side of traffic. L = Left side of traffic)

(C = Centered overhead)

Second Street UC (Replace)
Bridge No. 54-1259
I-215 "A" Line

	Number	Width	Height
Vehicle Openings	1		
EB	1	15.6	4.6
WB		15.6	4.6
Pedestrian Openings			
EB	1	1.53	4.4
WB	1	1.53	4.4
(Alternate Use of Sidewalk Required for Footing Construction)			
	Location	Spacing	
Falsework Pavement Lighting			
EB	R&L	7	
WB	R&L	7	

(Width and Height in meters)

(R = Right side of traffic. L = Left side of traffic)

(C = Centered overhead)

Third Street UC (Replace)
 Bridge No. 54-1260
 I-215 "A" Line

	Number	Width	Height
Vehicle Openings	1		
EB	1	15.6	4.6
WB		15.6	4.6
Pedestrian Openings			
EB	1	1.53	4.4
WB	1	1.53	4.4
(Alternate Use of Sidewalk Required for Footing Construction)			
	Location		Spacing
Falsework Pavement			
Lighting			
EB	R&L		7
WB	R&L		7

(Width and Height in meters)

(R = Right side of traffic. L = Left side of traffic)

(C = Centered overhead)

N215 to 5th Street to Off-Ramp
 Bridge No. 54-1251S
 "5NE" Line

	Number	Width	Height
Vehicle Openings	1	11.1	5.1
	Location		Spacing
Falsework Pavement			
Lighting	R&L		12 staggered ½ space

(Width and Height in meters)

(R = Right side of traffic. L = Left side of traffic)

(C = Centered overhead)

5th Street to S215 On-Ramp
 Bridge No. 54-1252K
 "5SO" Line

	Number	Width	Height
Vehicle Openings	1	11.1	5.1
	Location		Spacing
Falsework Pavement Lighting	R&L		12 staggered ½ space

(Width and Height in meters)
 (R = Right side of traffic. L = Left side of traffic)
 (C = Centered overhead)

9th Street OC (Replace)
 Bridge No. 54-1222
 "9TH" Line

	Number	Width	Height
Vehicle Openings	1	29.4	4.6
	Location		Spacing
Falsework Pavement Lighting	R&L		9
NB	R&L		9
SB	R&L		9

(Width and Height in meters)
 (R = Right side of traffic. L = Left side of traffic)
 (C = Centered overhead)

Baseline Street OC (Replace)
 Bridge No. 54-1223
 "B" Line

	Number	Width	Height
Vehicle Openings			
NB	1	18.3	4.6
SB	1	14.7	4.6
	Location		Spacing
Falsework Pavement Lighting	R&L		12
NB	C		12 staggered ½ space
SB	R&L		9

(Width and Height in meters)
 (R = Right side of traffic. L = Left side of traffic)
 (C = Centered overhead)

S259/S215 Connector (Replace)
 Bridge No. 54-1239F
 "S" Line

	Number	Width	Height
Vehicle Openings			
NB	1	18.3	4.6
SB	1	14.7	4.6
	Location	Spacing	
Falsework Pavement			
Lighting			
NB	R&L C	12 12 staggered ½ space	
SB	R&L	9	

(Width and Height in meters)

(R = Right side of traffic. L = Left side of traffic)

(C = Centered overhead)

N215/N259 Connector
 Bridge No. 54-1240G
 "N" Line

	Number	Width	Height
Vehicle Openings			
NB	1	11.1	4.6
	Location	Spacing	
Falsework Pavement			
Lighting			
NB	R&L	12 staggered ½ space	

(Width and Height in meters)

(R = Right side of traffic. L = Left side of traffic)

(C = Centered overhead)

16th Street Overcrossing/Overhead (Replace)
 Bridge No. 54-1241
 "16TH" Line

	Number	Width	Height
Vehicle Openings			
NB	1	18.3	4.6
SB	1	14.7	4.6
	Location	Spacing	
Falsework Pavement			
Lighting			
NB	R&L C	12 12 staggered ½ space	
SB	R&L	9	

(Width and Height in meters)

(R = Right side of traffic. L = Left side of traffic)

(C = Centered overhead)

The exact location of openings will be determined by the Engineer.

Closures are only allowed during the hours shown in the lane requirement charts included in this section "Maintaining Traffic," except for work required under Sections 7-1.08, "Public Convenience," and Section 7-1.09, "Public Safety."

The full width of the traveled way shall be open for use by public traffic when construction operations are not actively in progress.

Unless approved by the Engineer, the maximum length of a single stationary lane closure shall be 3 km.

Local authorities shall be notified at least 5 business days before work begins. The Contractor shall cooperate with local authorities to handle traffic through the work area and shall make arrangements to keep the work area clear of parked vehicles.

Adjacent ramps, in the same direction of travel, servicing 2 consecutive local streets shall not be closed simultaneously unless directed by the Engineer.

SC6-4(CA) (RAMP CLOSED) sign shall be used to inform motorists of the temporary closing of a connector, entrance ramp or exit ramp for more than one business day.

The SC6-4(CA) signs shall be installed at least 7 days before closing the connector or ramp, but not more than 14 days before the connector or ramp closure. The Contractor shall notify the Engineer at least 2 business days before installing the SC6-4(CA) signs. The SC6-4(CA) signs shall be stationary mounted at locations shown on the plans and as directed by the Engineer.

Accurate information shall be maintained on the SC6-4(CA) signs. The SC6-4(CA) signs, when no longer required, shall be immediately covered or removed.

Personal vehicles of the Contractor's employees shall not be parked on the traveled way or shoulders including sections closed to public traffic.

When work vehicles or equipment are parked on the shoulder within 1.8 m of a traffic lane, the shoulder area shall be closed as shown on the plans.

A minimum of one paved traffic lane, not less than 3.3 m wide, shall be open for use by public traffic in each direction of travel.

If minor deviations from the lane requirement charts are required, a written request shall be submitted to the Engineer at least 15 days before the proposed date of the closure. The Engineer may approve the deviations if there is no significant increase in the cost to the State and if the work can be expedited and better serve the public traffic.

When complete freeway, expressway or conventional highway closure is required, only one detour for each direction of travel will be allowed for the following operations: erection and removal of falsework and bridge demolition.

Designated legal holidays are: January 1st, the third Monday in February, the last Monday in May, July 4th, the first Monday in September, November 11th, Thanksgiving Day, and December 25th. When a designated legal holiday falls on a Sunday, the following Monday shall be a designated legal holiday. When November 11th falls on a Saturday, the preceding Friday shall be a designated legal holiday.

Special Days are: Martin Luther King Jr. Day, Lincoln's Birthday, Cesar Chavez Day, Good Friday thru Easter Sunday, Columbus Day, Day after Thanksgiving, December 26 thru January 2.

Full compensation for furnishing, erecting, maintaining, and removing and disposing of the C43(CA), SC6-3(CA), SC6-4(CA), W20-1, W21-5b, and C24(CA) signs shall be considered as included in the contract lump sum price paid for construction area signs and no additional compensation will be allowed therefor.

Lane Closure Restriction for Designated Legal Holidays and Special Days										
Thu	Fri	Sat	Sun	Mon	Tues	Wed	Thu	Fri	Sat	Sun
x	H xx	xx	xx	xxx						
	SD xx									
x	xx	H xx	xx	xxx						
		SD xx								
	x	xx	H xx	xx						
			SD xx							
	x	xx	xx	H xx	xxx					
	x	xx	xx	SD xx						
				x	H xx					
				x	SD xx					
					x	H xx	xxx			
						SD xx				
				xxx		x	H xx	xx	xx	xx
							SD xx			
Legends:										
	Refer to lane closure charts									
x	The full width of the traveled way shall be open for use by public traffic after 0600.									
xx	The full width of the traveled way shall be open for use by public traffic.									
xxx	The full width of the traveled way shall be open for use by public traffic until 1800.									
H	Designated Legal Holiday									
SD	Special Day									

District 8 Special Events List

No work that encroaches onto the traveled way of the affected Routes shall be allowed from 3 hours before to 2 hours following special events listed below unless otherwise permitted by the District Traffic Manager

Venue/Special Events	Affected Routes	Route Impact	Route Limits	Presently Identified The Month Of Events	Website	Contact #
Hyundai Pavilion	215 15	*** **	University Pkwy to I-15/215 Connector I-60 to Devore Road	Various events May - Oct yearly See web site	www.hyundaipavilion.com	909-880-6500
Route 66 Rendezvous	215	***	Mill St. to 5 th St	September	www.route-66.org	909-889-3980
California Speedway	10 15 210 66 60	*** *** *** *** ***	LA I-57 to SBD I-215 I-15/215 to SR-91 Haven to I-215 Haven to Cherry I-15 to County Line	Various events Thru the year See web site	www.californiaspeedway.com	909-429-5000
Temecula Valley Balloon & Wine Festival	15	**	SR-79 (Winchester Rd) and Rancho California	June	www.tvbwf.com	951-676-6713
Bob Hope Chrysler Classic	10	**	Palm Springs off ramp at SR-111	January	www.bhcc.com	760-346-8184
Kraft Nabisco Championship	10	**	Palm Springs off ramp at SR-111	March	www.nabiscochampionship.com	760-324-4546
Festival of Lights (Downtown Riverside)	91	**	I-15 to I-215/SR-60 split	November	No website	951-683-7100
Orange Blossom Festival	91	**	I-15 to I-215/SR-60 split	May	www.obfa.org	951-715-3400
March Air Show March Air Reserve Base	215	***	Cactus to Ramona Express Way	April	No website	909-655-1110
UCR Graduation	60/215	***	I-215/SR-60/SR-91 split to I-215/SR-60 split	June	www.commencement.ucr.edu	951-827-3144

Note: The dates of events change yearly. Contact numbers and websites provided to verify exact dates.

** Designates-Moderate Impact (20 minute delay or less)
 *** Designates-High Impact (30 minute delay or less)

Pedestrian access facilities shall be provided through construction areas within the right of way as shown on the plans and as specified herein. Pedestrian walkways shall be surfaced with hot mix asphalt, portland cement concrete or timber. The surface shall be skid resistant and free of irregularities. Hand railings shall be provided on each side of pedestrian walkways as necessary to protect pedestrian traffic from hazards due to construction operations or adjacent vehicular traffic. Protective overhead covering shall be provided as necessary to insure protection from falling objects and drip from overhead structures.

In addition to the required openings through falsework, pedestrian facilities shall be provided during pile driving, footing, wall, and other bridge construction operations. At least one walkway shall be available at all times. If the Contractor's operations require the closure of one walkway, then another walkway shall be provided nearby, off the traveled roadway.

Railings shall be constructed of wood, S4S, and shall be painted white. Railings and walkways shall be maintained in good condition. Walkways shall be kept clear of obstructions.

Full compensation for providing pedestrian facilities shall be considered as included in the prices paid for the various contract items of work involved and no additional compensation will be allowed therefor.

Chart No. 1 Freeway/Expressway Lane Requirements																										
County: SBd					Route/Direction: 215/NB										PM: 6.5/9.1											
Closure Limits:															EA: 007A11 & 007161											
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays		1	1	1	1	1	2																	2	2	
Fridays		1	1	1	1	1	2																		2	
Saturdays		2	1	1	1	1	1	2																	2	
Sundays		2	1	1	1	1	1	2	2																2	
<p>Legend:</p> <div style="border: 1px solid black; display: inline-block; width: 20px; height: 15px; margin-right: 5px;"></div> 1 Provide at least one through freeway lane open in direction of travel <div style="border: 1px solid black; display: inline-block; width: 20px; height: 15px; margin-right: 5px; margin-top: 5px;"></div> 2 Provide at least two adjacent through freeway lanes open in direction of travel <div style="border: 1px solid black; display: inline-block; width: 20px; height: 15px; margin-right: 5px; margin-top: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required.																										
<p>REMARKS:</p> <ol style="list-style-type: none"> 1. Closures may not be allowed during certain upcoming special events. 2. The closure starts with the first cone down and ends with the last cone picked up. No closure sign(s) shall be exposed to traffic more than 30 minutes before or after a closure, except as otherwise indicated in the special provisions. 3. The length of each closure shall not exceed 3 kilometers (2 miles). 4. In the same direction, consecutive closures shall be not less than 2 kilometers (1.25 miles) apart and lanes shall be closed on the same side of the roadbed. 																										
Date: 4/17/08					Prepared by: John H. Lee/SY										Validity: 24 months											

Chart No. 2																										
Freeway/Expressway Lane Requirements																										
County: SBd						Route/Direction: 215/SB										PM: 6.5/9.1										
Closure Limits:													EA: 007A11 & 007161													
FROM HOUR TO HOUR		24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays		1	1	1	1																	2	2	2	1	
Fridays		1	1	1	1																			2	2	
Saturdays		1	1	1	1	1	2																		2	
Sundays		1	1	1	1	1	1	2															2	2	1	
<p>Legend:</p> <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">1</div> Provide at least one through freeway lane open in direction of travel <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">2</div> Provide at least two adjacent through freeway lanes open in direction of travel <div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required.																										
<p>REMARKS:</p> <ol style="list-style-type: none"> 1. Closures may not be allowed during certain upcoming special events. 2. The closure starts with the first cone down and ends with the last cone picked up. No closure sign(s) shall be exposed to traffic more than 30 minutes before or after a closure, except as otherwise indicated in the special provisions. 3. The length of each closure shall not exceed 3 kilometers (2 miles). 4. In the same direction, consecutive closures shall be not less than 2 kilometers (1.25 miles) apart and lanes shall be closed on the same side of the roadbed. 																										

Date: 4/17/08

Prepared by: John H. Lee/SY

Validity: 24 months

Chart No. 3 Complete Freeway/Expressway Closure Hours																											
County: SBd								Route/Direction: 215/NB												PM: 6.5/9.1							
Closure Limits:																EA: 007A11 & 007161											
FROM HOUR TO HOUR		<div style="display: flex; justify-content: space-between; font-size: 0.8em;"> 24 123456789101112131415161718192021222324 </div>																									
Mondays through Thursdays		<div style="display: flex; justify-content: space-between;"> CCCCCCCC </div>																									
Fridays		<div style="display: flex; justify-content: space-between;"> CCCCCCC </div>																									
Saturdays		<div style="display: flex; justify-content: space-between;"> CCCCCCCC </div>																									
Sundays		<div style="display: flex; justify-content: space-between;"> CCCCCCCCC </div>																									
<p>Legend:</p> <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Freeway or expressway may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> No complete freeway or expressway closure is permitted. </div>																											
<p>REMARKS:</p> <ol style="list-style-type: none"> 1. Closures may not be allowed during certain upcoming special events and in both directions at the same time. 2. The closure starts with the first cone down and ends with the last cone picked up. No closure sign(s) shall be exposed to traffic more than 30 minutes before or after a closure, except as otherwise indicated in the special provisions. 3. The length of each closure shall not exceed 3 kilometers (2 miles). 4. In the same direction, consecutive closures shall be not less than 2 kilometers (1.25 miles) apart and lanes shall be closed on the same side of the roadbed. 5. A total of 15 nights of full closure will take place for all 3 bridges together (5 nights for each bridge). 																											

Date:4/17/08

Prepared by: John H. Lee/SY

Validity: 24 months

Chart No. 4 Complete Freeway/Expressway Closure Hours																													
County: SBd												Route/Direction: 215/SB												PM: 6.5/9.1					
Closure Limits:																EA: 007A11 & 007161													
FROM HOUR TO HOUR		24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																											
Mondays through Thursdays		C	C	C	C																					C	C	C	C
Fridays		C	C	C	C																							C	C
Saturdays		C	C	C	C	C	C																						C
Sundays		C	C	C	C	C	C	C																			C	C	C
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: inline-block; margin-right: 5px;"></div> Freeway or expressway may be closed completely. </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: inline-block; margin-right: 5px;"></div> No complete freeway or expressway closure is permitted. </div>																													
REMARKS: <ol style="list-style-type: none"> 1. Closures may not be allowed during certain upcoming special events and in both directions at the same time. 2. The closure starts with the first cone down and ends with the last cone picked up. No closure sign(s) shall be exposed to traffic more than 30 minutes before or after a closure, except as otherwise indicated in the special provisions. 3. The length of each closure shall not exceed 3 kilometers (2 miles). 4. In the same direction, consecutive closures shall be not less than 2 kilometers (1.25 miles) apart and lanes shall be closed on the same side of the roadbed. 5. A total of 15 nights of full closure will take place for all 3 bridges together (5 nights for each bridge). 																													

Date:4/17/08

Prepared by: John H. Lee/SY

Validity: 24 months

Chart No. 5
Complete Connector Closure Hours/Connector Lane Requirements

County: SBd

Route/Direction: 215/SB

PM: 6.5/9.1

Closure Limits: 259 Connector (PM 8.4)

EA: 007A11 & 007161

FROM HOUR TO HOUR	24	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Mondays through Thursdays	C	C	C	C																	C	C	C	C	
Fridays	C	C	C	C																			C	C	
Saturdays	C	C	C	C	C	C																		C	
Sundays	C	C	C	C	C	C	C															C	C	C	

Legend:

C	Connector may be closed completely
---	------------------------------------

	Work permitted within project right of way where shoulder or lane closure is not required.
--	--

REMARKS:

1. Closures may not be allowed during certain upcoming special events.
2. The closure starts with the first cone down and ends with the last cone picked up. No closure sign(s) shall be exposed to traffic more than 30 minutes before or after a closure, except as otherwise indicated in the special provisions.
3. No two consecutive (on or off) ramps to be closed in each direction simultaneously.
4. In interchanges, only one onramp (and only in one direction) will be closed at any time period.

Date:4/17/08

Prepared by: John H. Lee/SY

Validity: 24 months

Chart No. 6 Complete Ramp Closure Hours/Ramp Lane Requirements																											
County: SBd										Route/Direction: 215/NB										PM:6.5/9.1 EA:007A11 & 007161							
Closure Limits: 2 nd Street Offramp (PM 6.691), 2 nd Street Onramp (PM 6.919), & 13 th Offramp (PM 8.229)																											
FROM HOUR TO HOUR		24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																									
Mondays through Thursdays		C	C	C	C	C	C																			C	C
Fridays		C	C	C	C	C	C																				C
Saturdays		C	C	C	C	C	C	C																			C
Sundays		C	C	C	C	C	C	C	C																		C
Legend: <div style="display: flex; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">1</div> <div>Provide at least one ramp lane, not less than 11feet in width, open</div> </div> <div style="display: flex; margin-bottom: 5px;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> <div>Ramp may be closed completely</div> </div> <div style="display: flex;"> <div style="border: 1px solid black; width: 20px; height: 20px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> <div>Work permitted within project right of way where shoulder or lane closure is not required.</div> </div>																											
REMARKS: 1. Closures may not be allowed during certain upcoming special events. 2. The closure starts with the first cone down and ends with the last cone picked up. No closure sign(s) shall be exposed to traffic more than 30 minutes before or after a closure, except as otherwise indicated in the special provisions. 4. No two consecutive (on or off) ramps to be closed in each direction simultaneously. 4. In interchanges, only one onramp (and only in one direction) will be closed at any time period.																											

Date:4/17/08

Prepared by: John H. Lee/SY

Validity: 24 months

Chart No. 7 Complete Ramp Closure Hours/Ramp Lane Requirements																												
County: SBd								Route/Direction: 215/SB								PM:6.5/9.1 EA:007A11 & 007161												
Closure Limits: 2 nd Street Onramp (PM 6.683), 3rd Street Offramp (PM 7.118), & 13 th Offramp (PM 8.229)																												
FROM HOUR TO HOUR		24 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24																										
Mondays through Thursdays		C	C	C	C																							
Fridays		C	C	C	C																							
Saturdays		C	C	C	C	C	C																					
Sundays		C	C	C	C	C	C	C																				
Legend: <div style="display: flex; align-items: center; margin-bottom: 10px;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;">C</div> Ramp may be closed completely </div> <div style="display: flex; align-items: center;"> <div style="border: 1px solid black; width: 20px; height: 15px; display: flex; align-items: center; justify-content: center; margin-right: 5px;"></div> Work permitted within project right of way where shoulder or lane closure is not required. </div>																												
REMARKS: <ol style="list-style-type: none"> 1. Closures may not be allowed during certain upcoming special events. 2. The closure starts with the first cone down and ends with the last cone picked up. No closure sign(s) shall be exposed to traffic more than 30 minutes before or after a closure, except as otherwise indicated in the special provisions. 5. No two consecutive (on or off) ramps to be closed in each direction simultaneously. 4. In interchanges, only one onramp (and only in one direction) will be closed at any time period. 																												

Date:4/17/08

Prepared by: John H. Lee/SY

Validity: 24 months

Precast concrete members shall not be cast within the right of way of Route 215.

Erection of precast girders over existing BNSF railroad tracks at Redlands Loop Overhead (Widen) shall conform to the Overhead Agreement between SANBAG, STATE and BNSF.

Erection and removal of falsework at locations where falsework openings are required shall be undertaken one location at a time. During falsework erection and removal, public traffic in the lanes over which falsework is being erected or removed shall be detoured or stopped as specified in this section, "Maintaining Traffic." Falsework erection shall include adjustments or removal of components that contribute to the horizontal stability of the falsework system. Falsework removal shall include lowering falsework, blowing sand from sand jacks, turning screws on screw jacks, and removing wedges.

The Contractor shall have necessary materials and equipment on the site to erect or remove the girders or falsework in any one span or over any one opening before detouring or stopping public traffic.

10-1.21 CLOSURE REQUIREMENTS AND CONDITIONS

Closures shall conform to the provisions in "Maintaining Traffic" of these special provisions and these special provisions.

CLOSURE SCHEDULE

By noon Monday, the Contractor shall submit a written schedule of planned closures for the following week period, defined as Sunday noon through the following Sunday noon. Closures involving work (temporary barrier placement and paving operations) that will reduce horizontal clearances, traveled way inclusive of shoulders, to 2 lanes or less shall be submitted not less than 25 days and not more than 125 days before the anticipated start of operation. Closures involving work (pavement overlay, overhead sign installation, falsework and girder erection) that will reduce the vertical clearances available to the public, shall be submitted not less than 25 days and not more than 125 days before the anticipated start of operation.

The Closure Schedule shall show the locations and times of the proposed closures. The Closure Schedule request forms furnished by the Engineer shall be used. Closure Schedules submitted to the Engineer with incomplete or inaccurate information will be rejected and returned for correction and resubmittal. The Contractor will be notified of disapproved closures or closures that require coordination with other parties as a condition of approval.

Closure Schedule amendments, including adding additional closures, shall be submitted by noon to the Engineer, in writing, at least 3 business days in advance of a planned closure. Approval of Closure Schedule amendments will be at the discretion of the Engineer.

The Engineer shall be notified of cancelled closures 2 business days before the date of closure.

Closures that are cancelled due to unsuitable weather may be rescheduled at the discretion of the Engineer.

CONTINGENCY PLAN

A detailed contingency plan shall be prepared for reopening closures to public traffic. If required by "Beginning of Work, Time of Completion and Liquidated Damages" of these special provisions, the contingency plan shall be submitted to the Engineer before work at the job site

begins. Otherwise, the contingency plan shall be submitted to the Engineer within one business day of the Engineer's request.

LATE REOPENING OF CLOSURES

If a closure is not reopened to public traffic by the specified time, work shall be suspended in conformance with the provisions in Section 8-1.05, "Temporary Suspension of Work," of the Standard Specifications. No further closures are to be made until the Engineer has accepted a work plan, submitted by the Contractor, that will insure that future closures will be reopened to public traffic at the specified time. The Engineer will have 2 business days to accept or reject the Contractor's proposed work plan. The Contractor will not be entitled to compensation for the suspension of work resulting from the late reopening of closures.

For each 10-minute interval, or fraction thereof past the time specified to reopen the closure, the Department will deduct \$6900 for the Northbound Direction and \$5800 for Southbound Direction per interval from moneys due or that may become due the Contractor under the contract.

COMPENSATION

The Engineer shall be notified of delays in the Contractor's operations due to the following conditions, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of those conditions, and the Contractor's loss due to that delay could not have been avoided by rescheduling the affected closure or by judicious handling of forces, equipment and plant, the delay will be considered a right of way delay and will be compensated in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications:

1. The Contractor's proposed Closure Schedule is denied and his planned closures are within the time frame allowed for closures in "Maintaining Traffic" of these special provisions, except that the Contractor will not be entitled to compensation for amendments to the Closure Schedule that are not approved.
2. The Contractor is denied a confirmed closure.

Should the Engineer direct the Contractor to remove a closure before the time designated in the approved Closure Schedule, delay to the Contractor's schedule due to removal of the closure will be considered a right of way delay and compensation for the delay will be determined in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

10-1.22 TRAFFIC CONTROL SYSTEM FOR LANE CLOSURE

A traffic control system shall consist of closing traffic lanes and ramps in conformance with the details shown on the plans, the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, the provisions under "Maintaining Traffic" and "Construction Area Signs" of these special provisions, and these special provisions.

The provisions in this section will not relieve the Contractor from the responsibility to provide additional devices or take measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications.

Each vehicle used to place, maintain and remove components of a traffic control system on multilane highways shall be equipped with a Type II flashing arrow sign which shall be in

operation when the vehicle is being used for placing, maintaining or removing components. Vehicles equipped with Type II flashing arrow sign not involved in placing, maintaining or removing components when operated within a stationary lane closure shall only display the caution display mode. The sign shall be controllable by the operator of the vehicle while the vehicle is in motion. The flashing arrow sign shown on the plans shall not be used on vehicles which are being used to place, maintain and remove components of a traffic control system and shall be in place before a lane closure requiring its use is completed.

The 500 m section of lane closure, shown along lane lines between the 300 m lane closure tapers on the plans entitled "Traffic Control System for Lane Closures on Freeways and Expressways" and "Traffic Control System for Lane and Complete Closures on Freeways and Expressways" shall not be used.

The traffic cones shown to be placed transversely across closed traffic lanes and shoulders on the plans entitled "Traffic Control System for Lane Closures on Freeways and Expressways" and "Traffic Control System for Lane and Complete Closures on Freeways and Expressways" shall not be placed.

If components in the traffic control system are displaced or cease to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair the components to the original condition or replace the components and shall restore the components to the original location.

When lane and ramp closures are made for work periods only, at the end of each work period, components of the traffic control system, except portable delineators placed along open trenches or excavation adjacent to the traveled way, shall be removed from the traveled way and shoulder. If the Contractor so elects, the components may be stored at selected central locations designated by the Engineer within the limits of the highway right of way.

The contract lump sum price paid for traffic control system shall include full compensation for furnishing all labor, materials (including signs), tools, equipment, and incidentals, and for doing all the work involved in placing, removing, storing, maintaining, moving to new locations, replacing, and disposing of the components of the traffic control system shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The adjustment provisions in Section 4-1.03, "Changes," of the Standard Specifications shall not apply to the item of traffic control system. Adjustments in compensation for traffic control system will be made only for increased or decreased traffic control system required by changes ordered by the Engineer and will be made on the basis of the cost of the increased or decreased traffic control necessary. The adjustment will be made on a force account basis as provided in Section 9-1.03, "Force Account Payment," of the Standard Specifications for increased work and estimated on the same basis in the case of decreased work.

Traffic control system required by work which is classed as extra work, as provided in Section 4-1.03D of the Standard Specifications, will be paid for as a part of the extra work.

10-1.23 TRAFFIC CONTROL SYSTEM FOR RAMP CLOSURES

At the times and locations specified under "Maintaining Traffic" of these special provisions, ramps shall be closed in conformance with the details shown on the plans, the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, and these special provisions.

The provisions in this section will not relieve the Contractor of the responsibility to provide additional devices or take measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications.

If components used for closing a ramp are displaced or cease to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair the components to the original condition or replace the components and shall restore the components to the original location.

When ramp closures are made for work periods only, at the end of each work period, components used for the ramp closure, except portable delineators placed along open trenches or excavation adjacent to the traveled way, shall be removed from the traveled way and shoulder. If the Contractor so elects, the components may be stored at selected central locations designated by the Engineer within the limits of the highway right of way.

RAMP CLOSED signs [SC6-3(CA)] shall be used to inform motorists of the temporary closing of a freeway or expressway entrance or exit ramp for not more than one day.

RAMP CLOSED signs [SC6-4(CA)] shall be used to inform motorists of the temporary closing of a freeway or expressway entrance or exit ramp for more than one day.

The SC6-3(CA) or SC6-4(CA) signs shall be installed at least 7 calendar days prior to closing the ramp, but not more than 14 days in advance of the ramp closure. The Contractor shall notify the Engineer not less than 2 calendar days prior to installing the SC6-3(CA) or SC6-4(CA) signs. The SC6-3(CA) or SC6-4(CA) signs shall be stationary mounted at locations shown on the plans and shall remain in place and visible to motorists during ramp closures.

The Contractor shall be responsible for maintaining accurate and timely information on the SC6-3(CA) or SC6-4(CA) signs. The SC6-3(CA) or SC6-4(CA) signs, when no longer required or when the information becomes outdated, shall be immediately covered or removed, or the sign message shall be updated.

Full compensation for providing the ramp closures shown on the plans, including furnishing, installing, maintaining, covering, and removing SC6-3(CA) and SC6-4(CA) signs, shall be considered as included in the contract prices paid for the various items of work involved and no separate payment will be made therefor.

10-1.24 TRAFFIC CONTROL SYSTEM FOR STREET CLOSURES

At the times and locations specified under "Maintaining Traffic" of these special provisions, local streets shall be closed in conformance with the details shown on the plans, the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications, and these special provisions.

The provisions in this section will not relieve the Contractor of the responsibility to provide additional devices or take measures as may be necessary to comply with the provisions in Section 7-1.09, "Public Safety," of the Standard Specifications.

If components used for closing a local street are displaced or cease to operate or function as specified, from any cause, during the progress of the work, the Contractor shall immediately repair the components to the original condition or replace the components and shall restore the components to the original location.

When local street closures are made for work periods only, at the end of each work period, components used for the local street closure, except portable delineators placed along open trenches or excavation adjacent to the traveled way, shall be removed from the traveled way and shoulder. If the Contractor so elects, the components may be stored at selected central locations designated by the Engineer within the limits of the highway right of way.

STREET CLOSED signs [SC6-3(CA), modified for “street” closure] shall be used to inform motorists of the temporary closing of local street for not more than one day.

STREET CLOSED signs [SC6-4(CA) modified for “street” closure] shall be used to inform motorists of the temporary closing of local street for more than one day.

The SC6-3(CA) signs shall be installed at least 7 calendar days prior to closing the local street, but not more than 14 days in advance of the local street closure. The Contractor shall notify the Engineer not less than 2 calendar days prior to installing the SC6-3(CA) or SC6-4(CA) signs. The SC6-3(CA) or SC6-4(CA) signs shall be stationary mounted at locations shown on the plans and shall remain in place and visible to motorists during local street closures.

The Contractor shall be responsible for maintaining accurate and timely information on the SC6-3(CA) or SC6-4(CA) signs. The SC6-3(CA) or SC6-4(CA) signs, when no longer required or when the information becomes outdated, shall be immediately covered or removed, or the sign message shall be updated.

Full compensation for providing the local street closures shown on the plans, including furnishing, installing, maintaining, covering, and removing SC6-3(CA) and SC6-4(CA) signs, shall be considered as included in the contract prices paid for the various items of work involved and no separate payment will be made therefor.

10-1.25 TEMPORARY PAVEMENT DELINEATION

Temporary pavement delineation shall be furnished, placed, maintained, and removed in conformance with the provisions in Section 12-3.01, "General," of the Standard Specifications and these special provisions. Nothing in these special provisions shall be construed as reducing the minimum standards specified in the California MUTCD or as relieving the Contractor from the responsibilities specified in Section 7-1.09, "Public Safety," of the Standard Specifications.

GENERAL

When the work causes obliteration of pavement delineation, temporary or permanent pavement delineation shall be in place before opening the traveled way to public traffic. Laneline or centerline pavement delineation shall be provided for traveled ways open to public traffic. On multilane roadways (freeways and expressways) edgeline delineation shall be provided for traveled ways open to public traffic.

GENERAL

The Contractor shall perform the work necessary to establish the alignment of temporary pavement delineation, including required lines or markers. Surfaces to receive application of paint or removable traffic tape temporary pavement delineation shall be dry and free of dirt and loose material. Temporary pavement delineation shall not be applied over existing pavement delineation or other temporary pavement delineation. Temporary pavement delineation shall be maintained until superseded or replaced with a new pattern of temporary pavement delineation or permanent pavement delineation, or as determined by the Engineer.

Temporary pavement markers, including underlying adhesive, and removable traffic tape that are applied to the final layer of surfacing or existing pavement to remain in place or that conflicts with a subsequent or new traffic pattern for the area shall be removed when no longer required for the direction of public traffic, as determined by the Engineer.

TEMPORARY LANELINE AND CENTERLINE DELINEATION

When lanelines or centerlines are obliterated and temporary pavement delineation to replace the lines is not shown on the plans, the minimum laneline and centerline delineation to be provided for that area shall be temporary pavement markers placed at longitudinal intervals of

not more than 7.3 m. The temporary pavement markers shall be the same color as the laneline or centerline the pavement markers replace. Temporary pavement markers shall be, at the option of the Contractor, one of the temporary pavement markers listed for short term day/night use (14 days or less) or long term day/night use (180 days or less) in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. The temporary pavement markers shall be placed in conformance with the manufacturer's instructions. Temporary pavement markers for long term day/night use (180 days or less) shall be cemented to the surfacing with the adhesive recommended by the manufacturer, except epoxy adhesive shall not be used to place the temporary pavement markers in areas where removal of the temporary pavement markers will be required.

Temporary laneline or centerline delineation consisting entirely of temporary pavement markers listed for short term day/night use (14 days or less), shall be placed on longitudinal intervals of not more than 7.3 m and shall be used for a maximum of 14 days on lanes opened to public traffic. Before the end of the 14 days the permanent pavement delineation shall be placed. If the permanent pavement delineation is not placed within the 14 days, the Contractor shall replace the temporary pavement markers and provide additional temporary pavement delineation and shall bear the cost thereof. The additional temporary pavement delineation to be provided shall be equivalent to the pattern specified for the permanent pavement delineation for the area, as determined by the Engineer.

TEMPORARY EDGE LINE DELINEATION

On multilane roadways (freeways and expressways), when edgelines are obliterated and temporary pavement delineation to replace those edgelines is not shown on the plans, the edgeline delineation to be provided for those areas adjacent to lanes open to public traffic shall be as follows:

1. Temporary pavement delineation for right edgelines shall, at the option of the Contractor, consist of either a solid 100-mm wide traffic stripe tape of the same color as the stripe it replaces, traffic cones, portable delineators or channelizers placed at longitudinal intervals not to exceed 30 m.
2. Temporary pavement delineation for left edgelines shall, at the option of the Contractor, consist of either solid 100-mm wide traffic stripe tape of the same color as the stripe it replaces, traffic cones, portable delineators or channelizers placed at longitudinal intervals not to exceed 30 m or temporary pavement markers placed at longitudinal intervals of not more than 1.8 m.

Where removal of the 100-mm wide traffic stripe will not be required, painted traffic stripe conforming to the provisions of "Temporary Traffic Stripe (Paint)" of these special provisions may be used.

The lateral offset for traffic cones, portable delineators or channelizers used for temporary edgeline delineation shall be as determined by the Engineer. If traffic cones or portable delineators are used as temporary pavement delineation for edgelines, the Contractor shall provide personnel to remain at the project site to maintain the cones or delineators during the hours of the day that the portable delineators are in use.

Channelizers used for temporary edgeline delineation shall be the surface mounted type and shall be orange in color. Channelizer bases shall be cemented to the pavement in the same manner provided for cementing pavement markers to pavement in "Pavement Markers" of these special provisions, except epoxy adhesive shall not be used to place channelizers on the top layer

of pavement. Channelizers shall be, at the Contractor's option, one of the surface mount types (900 mm) listed in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Temporary edgeline delineation shall be removed when no longer required for the direction of public traffic as determined by the Engineer.

TEMPORARY TRAFFIC STRIPE (PAINT)

The painted temporary traffic stripe shall be complete in place at the location shown before opening the traveled way to public traffic.

Section 84-3, "Painted Traffic Stripes and Pavement Markings," of the Standard Specifications, except for payment. At the option of the Contractor, either one or 2 coats shall be applied regardless of whether on new or existing pavement.

TEMPORARY PAVEMENT MARKING (PAINT)

Temporary pavement marking consisting of painted pavement marking shall be applied and maintained at the locations shown on the plans. The painted temporary pavement marking shall be complete in place at the location shown before opening the traveled way to public traffic. Removal of painted temporary pavement marking will not be required.

Temporary painted pavement marking shall conform to the provisions in "Paint Traffic Stripe and Pavement Marking" of these special provisions, except for payment. At the option of the Contractor, either one or 2 coats shall be applied regardless whether on new or existing pavement.

At the Contractor's option, temporary removable pavement marking tape or permanent pavement marking tape listed in "Prequalified and Tested Signing and Delineation Materials" of these special provisions may be used instead of painted temporary pavement markings. When pavement marking tape is used, regardless of which type of tape is placed, the tape will be measured and paid for by the square meter as temporary pavement marking (paint).

TEMPORARY PAVEMENT MARKERS

Temporary pavement markers shall be applied complete in place before opening the traveled way to public traffic.

Temporary pavement markers shall be, at the option of the Contractor, one of the temporary pavement markers for long term day/night use (180 days or less) listed in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Temporary pavement markers shall be placed in conformance with the manufacturer's instructions and shall be cemented to the surfacing with the adhesive recommended by the manufacturer, except epoxy adhesive shall not be used in areas where removal of the pavement markers will be required.

Retroreflective pavement markers conforming to the provisions in "Pavement Markers" of these special provisions Section 85, "Pavement Markers," of the Standard Specifications may be used in place of temporary pavement markers for long term day/night use (180 days or less) except to simulate patterns of broken traffic stripe. Placement of the retroreflective pavement markers used for temporary pavement markers shall conform to the provisions in "Pavement Markers" of these special provisions except the waiting period provisions before placing the pavement markers on new hot mix asphalt surfacing as specified in Section 85-1.06,

"Placement," of the Standard Specifications shall not apply and epoxy adhesive shall not be used to place pavement markers in areas where removal of the pavement markers will be required.

MEASUREMENT AND PAYMENT

Temporary traffic stripe and temporary pavement marking shown on the plans will be measured and paid for in the same manner specified for paint traffic stripe and paint pavement marking in Section 84-3.06, "Measurement," and Section 84-3.07, "Payment," of the Standard Specifications.

Temporary pavement markers shown on the plans will be measured and paid for by the unit in the same manner specified for retroreflective pavement markers in Section 85-1.08, "Measurement," and Section 85-1.09, "Payment," of the Standard Specifications.

The contract price paid per linear meter for temporary pavement marking (paint) shall include full compensation for furnishing and installing pavement markers, both reflective and non-reflective, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.26 BARRICADE

Barricades shall be furnished, placed and maintained at the locations shown on the plans, specified in the Standard Specifications or in these special provisions or where designated by the Engineer. Barricades shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Attention is directed to "Prequalified and Tested Signing and Delineation Materials" of these special provisions regarding retroreflective sheeting for barricades.

Construction area sign and marker panels conforming to the provisions in Section 12-3.06, "Construction Area Signs," of the Standard Specifications shall be installed on barricades in a manner determined by the Engineer at the locations shown on the plans.

Sign panels for construction area signs and marker panels installed on barricades shall conform to the provisions in Section 12-3.06A, "Stationary Mounted Signs," of the Standard Specifications.

Full compensation for furnishing, installing, maintaining, and removing construction area signs and marker panels on barricades shall be considered as included in the contract unit price paid for the type of barricade involved and no separate payment will be made therefor.

Barricades shown on the plans as part of a traffic control system will be paid for as provided in "Traffic Control System for Lane Closure" of these special provisions and will not be included in the count for payment of barricades.

10-1.27 PORTABLE CHANGEABLE MESSAGE SIGN

Portable changeable message signs shall be furnished, placed, operated, and maintained at locations shown on the plans or where designated by the Engineer and shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions. Messages displayed on the portable changeable message signs shall be as specified on the plans and shall conform to Section 12-3.12 "Portable Changeable Message Signs," of the Standard Specifications and "Maintaining Traffic" of these special provisions."

A portable changeable message sign shall be placed in advance of the first warning sign for each stationary lane closure.

A portable changeable message sign shall be placed before and during ramp and connector closures.

10-1.28 TEMPORARY RAILING

Temporary railing (Type K) shall be placed as shown on the plans, as specified in the Standard Specifications or these special provisions or where ordered by the Engineer and shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Temporary railing (Type K) shall be secured in place before starting work for which the temporary railing is required.

Reflectors on temporary railing (Type K) shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Temporary railing (Type K) placed in conformance with the provisions in "Public Safety" of these special provisions will be neither measured nor paid for.

There will be no separate measurement and payment for traffic screen. It shall be considered as included in the linear meter prices paid for temporary railing (type K), and no additional compensation shall be allowed therefor.

10-1.29 CHANNELIZER

Channelizers shall conform to the provisions in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Channelizers shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

When no longer required for the work as determined by the Engineer, channelizers and underlying adhesive used to cement the channelizer bases to the pavement shall be removed. Removed channelizers and adhesive shall become the property of the Contractor and shall be removed from the site of work.

10-1.30 TEMPORARY TRAFFIC SCREEN

Temporary traffic screen shall be furnished, installed, and maintained on top of temporary railing (Type K) at the locations designated on the plans, specified in the special provisions or directed by the Engineer and shall conform to the provisions specified for traffic handling equipment and devices in Section 12, "Construction Area Traffic Control Devices," of the Standard Specifications and these special provisions.

Temporary traffic screen panels shall be new or used CDX Grade, or better, plywood or weather resistant strandboard mounted and anchored on temporary railing (Type K). Wale boards shall be new or used Douglas fir, rough sawn, Construction Grade, or better. Pipe screen supports shall be new or used galvanized steel pipe, Schedule 40. Nuts, bolts, and washers shall be cadmium plated. Screws shall be black or cadmium plated flat head, cross slotted screws with full thread length.

When no longer required, as determined by the Engineer, temporary traffic screen shall be removed from the site of the work and shall become the property of the Contractor.

If the Engineer orders a lateral move of temporary railing, with temporary traffic screen attached, and the repositioning is not shown on the plans, moving the temporary traffic screen will be paid for as part of the extra work for moving the temporary railing as specified in Section

12-4.01, "Measurement and Payment," of the Standard Specifications. Temporary traffic screen placed in excess of the length shown, specified or directed by the Engineer will not be paid for.

There will be no separate measurement and payment for traffic screen. It shall be considered included in the linear meter prices paid for temporary railing (type K), and no additional compensation shall be allowed therefor.

10-1.31 TEMPORARY CRASH CUSHION MODULE

This work shall consist of furnishing, installing, and maintaining sand filled temporary crash cushion modules in groupings or arrays at each location shown on the plans, as specified in these special provisions or where designated by the Engineer. The grouping or array of sand filled modules shall form a complete sand filled temporary crash cushion in conformance with the details shown on the plans and these special provisions.

Attention is directed to "Public Safety" and "Temporary Railing" of these special provisions.

Temporary crash cushions shall be secured in place prior to commencing work for which the temporary crash cushions are required.

Whenever the work or the Contractor's operations establishes a fixed obstacle, the exposed fixed obstacle shall be protected with a sand filled temporary crash cushion. The sand filled temporary crash cushion shall be in place prior to opening the lanes adjacent to the fixed obstacle to public traffic.

Sand filled temporary crash cushions shall be maintained in place at each location, including times when work is not actively in progress. Sand filled temporary crash cushions may be removed during a work period for access to the work provided that the exposed fixed obstacle is 4.6 m or more from a lane carrying public traffic and the temporary crash cushion is reset to protect the obstacle prior to the end of the work period in which the fixed obstacle was exposed. When no longer required, as determined by the Engineer, sand filled temporary crash cushions shall be removed from the site of the work.

At the Contractor's option, the modules for use in sand filled temporary crash cushions shall be either Energite III Inertial Modules, Fitch Inertial Modules or Traffix Sand Barrels manufactured after March 31, 1997, or equal:

1. Energite III and Fitch Inertial Modules, manufactured by Energy Absorption Systems, Inc., 35 East Wacker Drive, Suite 1100, Chicago, IL 60601:
 - 1.1. Northern California: Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828, telephone (800) 884-8274, FAX (916) 387-9734
 - 1.2. Southern California: Traffic Control Service, Inc., 1818 E. Orangethorpe, Fullerton, CA 92831-5324, telephone (800) 222-8274, FAX (714) 526-9501
2. Traffix Sand Barrels, manufactured by Traffix Devices, Inc., 220 Calle Pintoresco, San Clemente, CA 92672, telephone (949) 361-5663, FAX (949) 361-9205
 - 2.1. Northern California: United Rentals, Inc., 1533 Berger Drive, San Jose, CA 95112, telephone (408) 287-4303, FAX (408) 287-1929
 - 2.2. Southern California: Statewide Safety & Sign, Inc., P.O. Box 1440, Pismo Beach, CA 93448, telephone (800) 559-7080, FAX (805) 929-5786

Modules contained in each temporary crash cushion shall be of the same type at each location. The color of the modules shall be the standard yellow color, as furnished by the vendor, with black lids. The modules shall exhibit good workmanship free from structural flaws and objectionable surface defects. The modules need not be new. Good used undamaged modules conforming to color and quality of the types specified herein may be utilized. If used Fitch modules requiring a seal are furnished, the top edge of the seal shall be securely fastened to the wall of the module by a continuous strip of heavy duty tape.

Modules shall be filled with sand in conformance with the manufacturer's directions, and to the sand capacity in kilograms for each module shown on the plans. Sand for filling the modules shall be clean washed concrete sand of commercial quality. At the time of placing in the modules, the sand shall contain not more than 7 percent water as determined by California Test 226.

Modules damaged due to the Contractor's operations shall be repaired immediately by the Contractor at the Contractor's expense. Modules damaged beyond repair, as determined by the Engineer, due to the Contractor's operations shall be removed and replaced by the Contractor at the Contractor's expense.

Temporary crash cushion modules may be placed on movable pallets or frames. Comply with dimensions shown on the plans. The pallets or frames shall provide a full bearing base beneath the modules. The modules and supporting pallets or frames shall not be moved by sliding or skidding along the pavement or bridge deck.

A Type R or P marker panel shall be attached to the front of the crash cushion as shown on the plans, when the closest point of the crash cushion array is within 3.6 m of the traveled way. The marker panel, when required, shall be firmly fastened to the crash cushion with commercial quality hardware or by other methods determined by the Engineer.

At the completion of the project, temporary crash cushion modules, sand filling, pallets or frames, and marker panels shall become the property of the Contractor and shall be removed from the site of the work. Temporary crash cushion modules shall not be installed in the permanent work.

Temporary crash cushion modules will be measured by the unit as determined from the actual count of modules used in the work or ordered by the Engineer at each location. Temporary crash cushion modules placed in conformance with the provisions in "Public Safety" of these special provisions and modules placed in excess of the number specified or shown will not be measured nor paid for.

Repairing modules damaged by public traffic will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications. Modules damaged beyond repair by public traffic, when ordered by the Engineer, shall be removed and replaced immediately by the Contractor. Modules replaced due to damage by public traffic will be measured and paid for as temporary crash cushion module.

If the Engineer orders a lateral move of the sand filled temporary crash cushions and the repositioning is not shown on the plans, moving the sand filled temporary crash cushion will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications and these temporary crash cushion modules will not be counted for payment in the new position.

The contract unit price paid for temporary crash cushion module shall include full compensation for furnishing all labor, materials (including sand, pallets or frames and marker panels), tools, equipment, and incidentals, and for doing all the work involved in furnishing, installing, maintaining, moving, and resetting during a work period for access to the work, and removing from the site of the work when no longer required (including those damaged by public traffic) sand filled temporary crash cushion modules, complete in place, as shown on the plans,

as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.32 EXISTING HIGHWAY FACILITIES

The work performed in connection with various existing highway facilities shall conform to the provisions in Section 15, "Existing Highway Facilities," of the Standard Specifications and these special provisions.

Except as otherwise provided for damaged materials in Section 15-2.04, "Salvage," of the Standard Specifications, the materials to be salvaged shall remain the property of the State, and shall be cleaned, packaged, bundled, tagged, and hauled to the Department of Transportation Recycle Center at 175 Cluster Street, San Bernardino, CA 92408 and stockpiled.

The Contractor shall notify the Engineer and the Department of Transportation Recycle Coordinator, telephone (909) 383-4625 a minimum of 48 hours prior to hauling salvaged material to the Recycle Center.

Attention is directed to Section 7-1.06, "Safety and Health Provisions," of the Standard Specifications. Work practices and worker health and safety shall conform to the California Division of Occupational Safety and Health Construction Safety Orders Title 8, of the California Code of Regulations including Section 5158, "Other Confined Space Operations."

Existing footing concrete that is below ground and outside of the footing limits shown on the contract plans or original contract plans shall be removed as directed by the Engineer and will be paid in conformance with Section 4-1.03D, "Extra Work," of the Standard Specifications.

ABANDON CULVERT AND PIPE LINE

Existing culverts and utility pipelines, where shown on the plans to be abandoned, shall be abandoned in place or, at the option of the Contractor, the culverts and pipelines shall be removed and disposed of. Resulting openings into existing structures that are to remain in place shall be plugged with concrete conforming to the provisions in Section 90-10 "Minor Concrete," of the Standard Specifications. The concrete shall contain not less than 300 kg of cementitious material per cubic meter.

Abandoning culverts and pipelines in place shall conform to the following:

1. Culverts and pipelines that intersect the side slopes shall be removed to a depth of not less than one meter measured normal to the plane of the finished side slope, before being abandoned.
2. Culverts and pipelines 300 mm in diameter and larger, shall, at the Contractor's option, be backfilled with either sand, controlled low strength material or slurry cement backfill conforming to the provisions in Section 19-3.062, "Slurry Cement Backfill," of the Standard Specifications by any method acceptable to the Engineer that completely fills the pipe. Sand backfill material shall be clean, free draining, and free from roots and other deleterious substances.
3. The ends of culverts and pipelines shall be securely closed by a 150 mm thick tight fitting plug or wall of commercial quality concrete.

Culverts and pipelines shall not be abandoned until their use is no longer required. The Contractor shall notify the Engineer in advance of any intended culvert or pipeline abandonment.

If the Contractor elects to remove and dispose of a culvert or pipeline which is specified to be abandoned, as provided herein, backfill specified for the pipe will be measured and paid for in the same manner as if the culvert or pipeline has been abandoned in place.

Backfill will be measured by the cubic meter determined from the dimensions of the culverts and pipelines to be abandoned.

Controlled low strength material and slurry cement backfill, if used at the Contractor's option, will be measured and paid for by the cubic meter as sand backfill.

Full compensation for concrete plugs, pipe removal, structure excavation, and backfill (including sand, controlled low strength material or slurry cement backfill) shall be considered as included in the lump sum contract price paid for remove/abandon drainage facilities and no additional compensation will be allowed therefor.

SALVAGE METAL BRIDGE RAILING

Existing metal bridge railing, where shown on the plans to be salvaged, shall be removed and salvaged.

Salvaged metal bridge railing materials shall be hauled to Department of Transportation Recycle Center, 175 Cluster Street, San Bernardino, CA 92408, Telephone (909) 383-4625 and stockpiled.

Existing steel foundation tubes shall be completely removed and disposed of. Full compensation for removing and disposing of steel foundation tubes shall be considered as included in the contract price paid per meter for salvage metal beam guard railing and no separate payment will be made therefor.

REMOVE METAL BEAM GUARD RAILING

Existing metal beam guard railing, single or double metal beam guard railing with steel plates, single or double thrie beam barrier, where shown on the plans to be removed, shall be removed and disposed of.

Existing concrete anchors or steel foundation tubes shall be completely removed and disposed of. Full compensation for removing concrete anchors shall be considered as included in the contract price paid per meter for remove metal beam guard railing and no separate payment will be made therefor.

Full compensation for removing cable anchor assemblies, terminal anchor assemblies or steel foundation tubes, single or double metal beam guard railing with steel plates, single or double thrie beam barrier shall be considered as included in the contract price paid per meter for remove metal beam guard railing and no separate payment will be made therefor.

REMOVE SIGN STRUCTURE

Existing sign structures, where shown on the plans to be removed, shall be removed and disposed of.

Overhead sign structure removal shall consist of removing posts, frames, portions of foundations, sign panels, walkways with safety railings, and sign lighting electrical equipment.

Bridge mounted sign structure removal shall consist of removing sign panels and frames, sign lighting electrical equipment, walkways with safety railings, structural braces and supports, and hardware.

A sign structure shall not be removed until the structure is no longer required for the direction of public traffic.

Concrete foundations may be abandoned in place, except that the top portion, including anchor bolts, reinforcing steel, and conduits shall be removed to a depth of not less than 1.5 m below the adjacent finished grade. The resulting holes shall be backfilled and compacted with material equivalent to the surrounding material.

Electrical wiring shall be removed to the nearest pull box. Fuses within spliced connections in the pull box shall be removed and disposed of.

Electrical equipment, where shown on the plans, shall be salvaged.

REMOVE PAVEMENT MARKER

Existing pavement markers, including underlying adhesive, when no longer required for traffic lane delineation as determined by the Engineer, shall be removed and disposed of.

Full compensation for removing and disposing of pavement markers and underlying adhesive shall be considered as included in the contract price paid per meter for Remove Traffic Striping and Pavement Markers and no additional compensation shall be allowed therefor.

REMOVE CHAIN LINK RAILING TYPE 7 (MODIFIED)

Existing chain link railing Type 7 (modified), including anchorages to existing concrete barrier, where shown on the plans, shall be removed and disposed of.

Full compensation for backfilling and compacting post holes in the median and for cutting off pipe post sleeves or other type post anchorages on structures shall be considered as included in the contract price paid per meter for remove Chain Link Railing Type 7 (Modified) and no additional compensation will be allowed therefor.

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REMOVE TRAFFIC STRIPE

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Traffic stripe shall be removed at the locations shown on the plans and as directed by the Engineer.

Attention is directed to "Water Pollution Control" of these special provisions.

Waste from removal of yellow thermoplastic and yellow painted traffic stripe contains lead chromate in average concentrations greater than or equal to 5 mg/L Soluble Lead or 1000 mg/kg Total Lead. Yellow thermoplastic and yellow paint traffic stripe exist from Station 104+20 to Station 145+00 on mainline I-215, and from the I-215/SR 259 Interchange to Station 246+40 on SR 259. Residue produced from the removal of yellow thermoplastic and yellow paint contains heavy metals in concentrations that exceed thresholds established by the California Health and Safety Code and Title 22 of the California Code of Regulations. The Contractor shall assume that the residue is not regulated under the Federal Resource Conservation and Recovery Act (RCRA). Yellow thermoplastic and yellow paint may produce toxic fumes when heated.

JMF 01/20/09

The removed yellow thermoplastic and yellow paint shall be disposed of at a Class 1 disposal facility in conformance with the requirements of the disposal facility operator within 45 days after accumulating 100 kg of residue and dust. The Contractor shall make necessary arrangements to test the yellow thermoplastic and yellow paint residue as required by the disposal facility and these special provisions. Testing shall include, at a minimum, (1) Total Lead by EPA Method 6010B and Chromium by EPA Method 7000 series, (2) Soluble Lead and Chromium by California Waste Extraction Test, and (3) Soluble Lead and Chromium by Toxicity Characteristic Leaching Procedure. From the first 840 L of waste or portion thereof, if less than 840 L of waste are produced, a minimum of four randomly selected samples shall be taken and analyzed individually. Samples shall not be composited. From each additional 3360 L of waste or portion thereof, if less than 3360 L are produced, a minimum of one additional random sample shall be taken and analyzed. Each sample shall be homogenized prior to analysis by the laboratory performing the analyses. A sample aliquot sufficient to cover the amount necessary for the total and the soluble analyses shall then be taken. This aliquot shall be homogenized a second time and the total and soluble (if necessary) run on this aliquot. The homogenization process shall not include grinding of the samples. The Contractor shall submit the name and location of the disposal facility and analytical laboratory along with the testing requirements to the Engineer not less than 5 days prior to the start of removal of yellow thermoplastic and yellow painted traffic stripe. The analytical laboratory shall be certified by the Department of Health Services Environmental Laboratory Accreditation Program for all analyses to be performed. Test results shall be provided to the Engineer for review prior to signing a waste profile as requested by the disposal facility, prior to issuing an EPA identification number, and prior to allowing removal of the waste from the site.

The Contractor shall prepare a project specific Lead Compliance Plan to prevent or minimize worker exposure to lead while handling removed yellow thermoplastic and yellow paint residue. Attention is directed to Title 8, California Code of Regulations, Section 1532.1, "Lead," for specific Cal-OSHA requirements when working with lead.

The Lead Compliance Plan shall contain the elements listed in Title 8, California Code of Regulations, Section 1532.1(e)(2)(B). Before submission to the Engineer, the Lead Compliance Plan shall be approved by an Industrial Hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene. The Plan shall be submitted to the Engineer at least 7 days prior to beginning removal of yellow thermoplastic and yellow paint.

Prior to removing yellow thermoplastic and yellow painted traffic stripe personnel who have no prior training, including State personnel, shall complete a safety training program provided by the Contractor that meets the requirements of Title 8, California Code of Regulations, Section 1532.1, "Lead," and the Contractor's Lead Compliance Program.

JMF 08/06/05

Personal protective equipment, training, and washing facilities required by the Contractor's Lead Compliance Plan shall be supplied to State personnel by the Contractor. The number of State personnel will be 7.

JMF 09/25/08

Where grinding or other methods approved by the Engineer are used to remove yellow thermoplastic and yellow painted traffic stripe, the removed residue, including dust, shall be contained and collected immediately. Collection shall be by a high efficiency particulate air (HEPA) filter equipped vacuum attachment operated concurrently with the removal operations or other equally effective methods approved by the Engineer. The Contractor shall submit a written work plan for the removal, storage, and disposal of yellow thermoplastic and yellow painted traffic stripe to the Engineer for approval not less than 15 days prior to the start of the removal

operations. Removal operations shall not be started until the Engineer has approved the work plan.

JMF 09/25/08

The removed yellow thermoplastic and yellow painted traffic stripe residue shall be stored and labeled in covered containers. Labels shall conform to the provisions of Title 22, California Code of Regulations, Sections 66262.31 and 66262.32. Labels shall be marked with date when the waste is generated, the words "Hazardous Waste," composition and physical state of the waste (for example, asphalt grindings with thermoplastic or paint), the word "Toxic," the name and address of the Engineer, the Engineer's telephone number, contract number, and Contractor or subcontractor. The containers shall be metal and a type approved by the United States Department of Transportation for the transportation and temporary storage of the removed residue. The containers shall be handled so that no spillage will occur. The containers shall be stored in a secured fenced enclosure at a location within the project limits until disposal, as approved by the Engineer.

JMF 09/25/08

If the yellow thermoplastic and yellow painted traffic stripe residue is transported to a Class 1 disposal facility as a hazardous waste, a manifest shall be used, and the transporter shall be registered with the California Department of Toxic Substance Control. The Contractor shall submit a written request for the United States Environmental Protection Agency Identification Number (US EPA ID Number) to the Engineer. The Engineer will obtain the US EPA ID Number and sign all manifests as the generator within 2 working days of receiving sample test results, approving the test methods, and receiving the written request for the US EPA ID Number from the Contractor. The Contractor shall submit receiving landfill documentation of proper disposal to the Engineer.

Additional disposal costs for removal residue regulated under RCRA, as determined by test results, will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Nothing in these special provisions shall relieve the Contractor of the Contractor's responsibilities as specified in Section 7-1.09, "Public Safety," of the Standard Specifications.

JMF 08/06/05

The contract lump sum price paid for Lead Compliance Plan (Stripe Removal) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparing the Lead Compliance Plan, including paying the Certified Industrial Hygienist, and for providing personnel protective equipment, training, air monitoring, and medical surveillance, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

JMF 01/20/09

Full compensation for providing a written work plan for the removal, storage, and disposal of yellow thermoplastic and yellow painted traffic stripe and for providing receiving landfill documentation of proper disposal of yellow thermoplastic and yellow painted traffic stripe shall be considered as included in the contract prices paid per meter for remove yellow thermoplastic traffic stripe and remove yellow painted traffic stripe and no separate payment will be made therefor.

REMOVE OR ABANDON DRAINAGE FACILITY

Existing box culverts, inlets, manholes, concrete channels, concrete ditches, headwalls/endwalls, pipes, and pump stations where any portion of these structures are within one meter of the grading plane in excavation areas, or within 0.3-m of original ground in embankment areas, or where shown on the plans to be removed, shall be completely removed and disposed of.

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Full compensation for removing and reusing frames and grates shall be considered as included in the contract price paid for the item of work requiring reuse of the frame and grate.

All the work under this section shall be measured and paid for by the lump sum contract item remove drainage facilities, and shall include all materials, tools, equipment, and incidentals, and for doing all the work necessary to remove drainage facilities completely, plug existing pipes, abandon existing pipes in place, as shown on the plans, specified in the specifications, and as directed by the Engineer.

Removing the pump station shall be measured and paid for by the lump sum item Remove Pump Station, and shall include all materials, tools, equipment, and incidentals, and for doing all the work necessary to remove the pump station completely, as shown on the plans, specified in the specifications, and as directed by the Engineer.

REMOVE OR RELOCATE ROADSIDE SIGN

Existing roadside signs, at those locations shown on the plans to be removed, shall be removed and disposed of.

Existing roadside signs shall not be removed until replacement signs have been installed or until the existing signs are no longer required for the direction of public traffic, unless otherwise directed by the Engineer.

~~Full compensation for salvaging sign panels shall be considered as included in the contract unit price paid for remove roadside sign and no separate payment will be made therefor.~~

All the work under this section shall be measured and paid for by the lump sum contract item remove or relocate sign, and shall include all materials, tools, equipment, and incidentals, and for doing all the work necessary to remove or relocate sign completely, as shown on the plans, specified in the specifications, and as directed by the Engineer.

RECONSTRUCT WROUGHT IRON FENCE

Existing wrought iron fence, at the locations shown on the plans, shall be removed and reconstructed.

Fence removed in excess of that required for reconstructing wrought iron fence shall be disposed of. Full compensation for removing and disposing of excess wrought iron fence shall be considered as included in the contract price paid per linear foot for reconstruct wrought iron fence and no separate payment will be made therefor.

RELOCATE ROADSIDE SIGN

Existing roadside signs shall be removed and relocated to the new locations shown on the plans.

Each roadside sign shall be installed at the new location on the same day that the sign is removed from its original location.

Two holes shall be drilled in each existing post as required to provide the breakaway feature shown on the plans.

All the work under this section shall be measured and paid for by the lump sum contract item remove or relocate sign, and shall include all materials, tools, equipment, and incidentals, and for doing all the work necessary to remove or relocate sign completely, as shown on the plans, specified in the specifications, and as directed by the Engineer.

ADJUST FRAME AND COVER TO GRADE

Frames and covers of existing manholes, junction structures, water valves or other facilities shall be adjusted to grade in conformance with the provisions in Section 15-2.05, "Reconstruction," of the Standard Specifications.

REMOVE PORTLAND CEMENT CONCRETE PAVEMENT

Removing portland cement concrete pavement shall conform to the provisions in Section 15-3, "Removing Concrete," of the Standard Specifications.

Where no joint exists in the pavement on the line at which concrete is to be removed, a straight, neat cut with a power driven saw shall be made along the line to a minimum depth of 50 mm before removing the concrete.

The quantities of portland cement concrete pavement removed will be measured and paid for by the square meter.

No deduction will be made from any excavation quantities for the quantity of portland cement concrete pavement removed.

Full compensation for removing bituminous or other overlying material and sawing joints at removal lines, as required, shall be considered as included in the contract price paid per square meter for remove concrete pavement and no additional compensation will be allowed therefor.

REMOVE BASE AND SURFACING

Existing base and bituminous surfacing shown on the plans to be removed, shall be removed to a depth of at least 150 mm below the grade of the existing surfacing. Resulting holes and depressions shall be backfilled with earthy material selected from excavation to the lines and grade established by the Engineer.

Removing base and surfacing will be measured by the cubic meter in the same manner specified for roadway excavation in conformance with the provisions in Section 19, "Earthwork," of the Standard Specifications and will be paid for at the contract price per cubic meter for remove base and surfacing.

BRIDGE REMOVAL

Removing bridges or portions of bridges shall conform to the provisions in Section 15-4, "Bridge Removal," of the Standard Specifications and these special provisions.

BRIDGE REMOVAL (LOCATION A) FOURTH STREET ON RAMP UNDERCROSSING

Contract No. 0071V4

(Bridge No. 54-492R)

Bridge removal shall consist of removing an existing three-span, cast-in-place reinforced concrete “Tee” beam bridge measuring approximately 37 meters long and 15 meters wide.

**BRIDGE REMOVAL (LOCATION B)
SIXTH STREET OFF RAMP OVERCROSSING
(Bridge No. 54-494C)**

Bridge removal shall consist of removing an existing three-span, cast-in-place reinforced concrete box girder bridge measuring approximately 41 meters long and 9 meters wide.

**BRIDGE REMOVAL (LOCATION C)
SECOND STREET UNDERCROSSING
(Bridge No. 54-490)**

Bridge removal shall consist of removing, as shown on the contract plans, an existing single-span cast-in-place reinforced concrete box girder bridge measuring approximately 26 meters long and 35 meters wide.

**BRIDGE REMOVAL (LOCATION D)
THIRD STREET UNDERCROSSING
(Bridge No. 54-491)**

Bridge removal shall consist of removing, as shown on the contract plans, an existing single-span cast-in-place reinforced concrete box girder bridge measuring approximately 26 meters long and 23 meters wide. Removal shall also include removal of Third Street UC (Temp) Bridge as shown on contract plans.

**BRIDGE REMOVAL (LOCATION E)
9TH STREET OVERCROSSING
(Bridge No. 54-496)**

Bridge removal shall consist of removing, as shown on the contract plans, an existing two-span cast-in-place reinforced concrete box girder bridge measuring approximately 75 meters long and 19 meters wide.

**BRIDGE REMOVAL (LOCATION F)
BASELINE STREET OVERCROSSING
(Bridge No. 54-498)**

Bridge removal shall consist of removing, as shown on the contract plans, an existing six-span cast-in-place reinforced concrete box girder bridge measuring approximately 110 meters long and 19 meters wide.

**BRIDGE REMOVAL (LOCATION G)
S259/S215 CONNECTOR OVERCROSSING
(Bridge No. 54-523F)**

Bridge removal shall consist of removing, as shown on the contract plans, an existing four-span cast-in-place reinforced concrete box girder bridge measuring approximately 110 meters long and 10 meters wide.

BRIDGE REMOVAL (LOCATION H)
16TH STREET OVERCROSSING
(Bridge No. 54-522)

Bridge removal shall consist of removing, as shown on the contract plans, an existing seven-span cast-in-place reinforced concrete box girder bridge measuring approximately 162 meters long and 13 meters wide.

BRIDGE REMOVAL (PORTION) (LOCATION A)
REDLANDS LOOP OVERHEAD
(Bridge No. 54-489)

Bridge removal (portion) shall consist of removing, as shown on the contract plans, existing MBGR, Type 25 Concrete Barrier, portions of wingwall, and portions of top of Abutment Backwall.

BRIDGE REMOVAL (PORTION) (LOCATION B)
RIALTO AVENUE UNDERCROSSING
(Bridge No. 54-488)

Bridge removal (portion) shall consist of removing, as shown on the contract plans, existing MBGR, Type 27 Concrete Barrier, conduits, deck drains, portion of sidewalk and portions abutment footings. Removal shall also consist of removing existing portions of sidewalk at Rialto Avenue UC (S215 to 2ND St On-Ramp) and Rialto Avenue UC (N215 to 2ND St Off-Ramp).

Removed materials that are not to be salvaged or used in the reconstruction shall become the property of the Contractor and shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

The Contractor shall submit a complete bridge removal plan to the Engineer for each bridge listed above, detailing procedures, sequences, and all features required to perform the removal in a safe and controlled manner.

The bridge removal plan shall include, but not be limited to the following:

- A. The removal sequence, including staging of removal operations.
- B. Equipment locations on the structure during removal operations.
- C. Temporary support shoring or temporary bracing.
- D. Locations where work is to be performed over traffic, utilities, or railroad property.
- E. Details, locations, and types of protective covers to be used.
- F. Measures to assure that people, property, utilities, and improvements will not be endangered.

G. Details and measures for preventing material, equipment, and debris from falling onto public traffic, or railroad property.

When protective covers are required for removal of portions of a bridge, or when superstructure removal works on bridges are involved, the Contractor shall submit working drawings, with design calculations, to the Engineer for the proposed bridge removal plan, and the bridge removal plan shall be prepared and signed by an engineer who is registered as a Civil Engineer in the State of California. The design calculations shall be adequate to demonstrate the stability of the structure during all stages of the removal operations. Calculations shall be provided for each stage of bridge removal and shall include dead and live load values assumed in the design of protective covers. At a minimum, a stage will be considered to be removal of the deck, the soffit, or the girders, in any span; or walls, bent caps, or columns at support locations.

Temporary support shoring, temporary bracing, and protective covers, as required, shall be designed and constructed in conformance with the provisions in Section 51-1.06, "Falsework," of the Standard Specifications and these special provisions.

The assumed horizontal load to be resisted by the temporary support shoring and temporary bracing, for removal operations only, shall be the sum of the actual horizontal loads due to equipment, construction sequence or other causes, and an allowance for wind, but in no case shall the assumed horizontal load to be resisted in any direction be less than 5 percent of the total dead load of the structure to be removed.

The bridge removal plan shall conform to the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The number of sets of drawings, design calculations, and unless otherwise specified in the following table, the time for reviewing bridge removal plans shall be the same as specified for falsework working drawings in Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications.

The time to be provided for the Engineer's review of the bridge removal plans for removing specific structures, or portions thereof, shall be as follows:

Structure or Portion of Structure	Review Time - Weeks
FOURTH ST ON RAMP UC (Bridge Number 54-492R)	5
SIXTH ST OFF RAMP OC (Bridge Number 54-494C)	5
RIALTO AVE UC (WIDEN) (Bridge Number 54-488)	5
REDLANDS LOOP OH (WIDEN) (Bridge Number 54-489)	5
SECOND ST UC (Bridge Number 54-490)	5
THIRD ST UC (Bridge Number 54-491)	5
9 TH STREET OC (Bridge Number 54-0496)	9
BASELINE STREET OC (Bridge Number 54-498)	9
S259/S215 CONNECTOT OC (Bridge Number 54-523F)	9
16TH STREET OC (Bridge Number 54-522)	9

For bridge removal over railroads, approval by the Engineer of the bridge removal plans will be contingent upon the drawings being satisfactory to the railroad company involved.

Temporary support shoring, temporary bracing, and protective covers over railroads, shall conform to the latest guidelines of the railroad company involved and shall provide the minimum clearances required under "Relations with Railroad Company" of these special provisions for the passage of railroad traffic.

The following additional requirements apply to the removal of bridges or portions of bridges that are over or adjacent to roadways that may be closed to public traffic for only brief periods of time:

- A. The closure of roadways to public traffic shall conform to the provisions in "Order of Work" and "Maintaining Traffic" of these special provisions.
- B. Prior to closing a roadway to traffic to accommodate bridge removal operations, the Contractor shall have all necessary workers, materials, and equipment at the site as needed to proceed with the removal work in an expeditious manner. While the roadway is closed to public traffic, work shall be pursued promptly and without interruption until the roadway is reopened to public traffic.
- C. Bridge removal operations shall be performed during periods of time that the roadway is closed to public traffic except as specified herein for preliminary work.
- D. Preliminary work shall be limited to operations that will not reduce the structural strength or stability of the bridge, or any element thereof, to a level that in the judgment of the Engineer would constitute a hazard to the public. This preliminary work shall also be limited to operations that cannot cause debris or any other material to fall onto the roadway. Protective covers may be used to perform preliminary work such as chipping or cutting the superstructure into segments, provided the covers are of sufficient strength to support all loads and are sufficiently tight to prevent dust and fine material from sifting down onto the traveled way. Protective covers shall extend at least 1.2 m beyond the limit of the work underway. Bottom slabs of box girders may be considered to be protective covers for preliminary work performed on the top slab inside the limits of the exterior girders.
- E. Temporary support shoring and temporary bracing shall be used in conjunction with preliminary work when necessary to insure the stability of the bridge.
- F. Temporary support shoring, temporary bracing, and protective covers shall not encroach closer than 2.4 m horizontally from the edge or 4.6 m vertically above any traffic lane or shoulder that is open to public traffic.
- G. During periods when the roadway is closed to public traffic, debris from bridge removal operations may be allowed to fall directly onto the lower roadway provided adequate protection is furnished for all highway facilities. The minimum protection for paved areas shall be a 0.6-m thick earthen pad or a 25-mm thick steel plate placed over the area where debris can fall. Prior to reopening the roadway to public traffic, all debris, protective pads, and devices shall be removed and the roadway swept clean with wet power sweepers or equivalent methods.
- H. The removal operations shall be conducted in such a manner that the portion of the structure not yet removed remains in a stable condition at all times. For girder bridges, each girder shall be completely removed within a span before the removal of the adjacent girder is begun. For slab type bridges, removal operations within a span shall be performed along a front that roughly parallels the primary reinforcing steel.

The following additional requirements apply to the removal of bridges or portions of bridges whenever the removal work is to be performed over public traffic or railroad property:

- A. A protective cover shall be constructed before beginning bridge removal work. The protective cover shall be supported by shoring, falsework, or members of the existing structure. The Contractor shall be responsible for designing and constructing safe and adequate protective covers, shoring, and falsework with sufficient strength and rigidity to support the entire load to be imposed.
- B. The construction and removal of the protective cover, and the installation and removal of temporary railings shall conform to the provisions in "Order of Work," "Maintaining Traffic," and "Temporary Railings" of these special provisions.
- C. Bridge removal methods shall be described in the working drawings, supported by calculations with sufficient details to substantiate live loads used in the protective cover design. Dead and live load values assumed for designing the protective cover shall be shown on the working drawings.
- D. The protective cover shall prevent any materials, equipment, or debris from falling onto public traffic or railroad property. The protective cover shall have a minimum strength equivalent to that provided by good, sound Douglas fir planking having a nominal thickness of 50 mm. Additional layers of material shall be furnished as necessary to prevent fine materials or debris from sifting down upon the traveled way and shoulders.
- E. During the removal of bridge segments, and when portions of the bridge, such as deck slabs or box girder slabs, comply with the requirements for the protective cover, a separate protective cover need not be constructed.
- F. At locations where only bridge railing is to be removed, the protective cover shall extend from the face of the exterior girder or at least 0.6-m inside of the bridge railing to be removed, whichever is less, to at least 1.2 m beyond the outside face of the bridge railing.
- G. At locations where entire girders are to be removed, the protective cover shall extend at least 3 m beyond the outside face of the bridge railing.
- H. The protective cover shall provide the openings specified under "Maintaining Traffic" of these special provisions, except that when no openings are specified for bridge removal, a vertical opening of 4.6 m and a horizontal opening of 11.1 m shall be provided for the passage of public traffic.
- I. Falsework or supports for protective covers shall not extend below the vertical clearance level nor to the ground line at any location within the roadbed.
- J. The construction of the protective cover as specified herein shall not relieve the Contractor of responsibilities specified in Section 7-1.12A, "Indemnification," and Section 7-1.12B, "Insurance," of the Standard Specifications.
- K. Before removal of the protective cover, the Contractor shall clean the protective cover of all debris and fine material.

For bridge removal that requires the Contractor's registered engineer to prepare and sign the bridge removal plan, the Contractor's registered engineer shall be present at all times when bridge removal operations are in progress. The Contractor's registered engineer shall inspect the bridge removal operation and report in writing on a daily basis the progress of the operation and the status of the remaining structure. A copy of the daily report shall be available at the site of the work at all times. Should an unplanned event occur or the bridge operation deviate from the approved bridge removal plan, the Contractor's registered engineer shall submit immediately to

the Engineer for approval, the procedure of operation proposed to correct or remedy the occurrence.

Existing deck drains at Rialto Avenue UC (Widen), Br. No. 54-0488, shall be removed and a concrete patch installed as shown on the plans. Concrete for the patch shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions. Bar reinforcing steel shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

Full compensation for repairing existing deck drain at Rialto Avenue UC (Widen) (Bridge No. 54-0488), including concrete and bar reinforcing steel, shall be considered as included in the contract lump sum price paid for Bridge Removal (Portion), Location B, and no separate payment will be made therefor.

REMOVE ASPHALT CONCRETE SURFACING

Existing asphalt concrete surfacing shall be removed to the top of existing portland cement concrete slab at bridge approaches as shown on the plans and as described in these special provisions.

The Contractor shall verify the depth of asphalt concrete surfacing.

The method of removal shall be selected by the Contractor. Equipment or procedures that damage the remaining concrete surface, as determined by the Engineer, shall not be used.

Cold milling equipment may be used to remove asphalt concrete surfacing, except that at least 13 mm of asphalt concrete surfacing shall remain on the deck after the cold milling operation. Removal of the remaining 13 mm of asphalt concrete surfacing shall be performed by other means as selected by the Contractor.

If the Contractor elects to use cold milling equipment, the cold milling equipment shall have the capability to 1) remove concrete a minimum depth of 6 mm, 2) provide a surface relief of no more than 6 mm, and 3) maintain a 4-mm grade tolerance; and shall have the following features:

- A. 3 or 4 riding tracks.
- B. An automatic grade control system with an electronic averaging system having 3 sensors on each side of the equipment.
- C. A conveyer system that leaves no debris on the bridge.
- D. A drum that operates in an up-milling direction.
- E. Bullet tooth tools with tungsten carbide steel cutting tips.
- F. A 16-mm maximum tool spacing.
- G. A maximum operating mass of 25400 kg.

The Contractor shall select which sensors are activated during the milling operation to produce the profile required as shown on the plans.

The cold milling equipment shall have a complete set of new tooth tools at the beginning of the job, and the tooth tools shall be replaced as necessary to perform the work satisfactorily.

The Contractor shall provide personnel on each side of the milling drum to monitor the milling operation and maintain radio communication with the operator at all times during the milling operation.

The outline of the asphalt concrete to be removed shall be cut with a power-driven saw to a depth of not less than 50 mm before removing the surfacing. Surfacing shall be removed without damage to surfacing that is to remain in place. Any damage to pavement which is to remain in place shall be repaired to a condition satisfactory to the Engineer, or the damaged pavement shall

be removed and replaced with new asphalt concrete when ordered by the Engineer. Repairing or removing and replacing pavement damaged outside the limits of surfacing to be removed shall be at the Contractor's expense and will not be measured or paid for.

All removed materials shall become the property of the Contractor and shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Remove asphalt concrete surfacing will be measured by the square meter.

The contract price paid per square meter for remove asphalt concrete surfacing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in removing asphalt concrete surfacing as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

REMOVE CONCRETE

Concrete, where shown on the plans to be removed, shall be removed.

Removing concrete curb curb drain, and curb and gutter will be measured by the meter, measured along the curb, before removal operations. Removing concrete sidewalk and cross gutter will be measured by the square meter before removal operations. Removing concrete retaining wall and masonry wall will be measured by the meter, measured along the top of the wall, before removal operations, and will be paid for as remove retaining wall. Removing barrier will be measured by the meter, measured along the top of barrier, before removal operations.

Concrete removed shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Where no joint exists between concrete to be removed and concrete to remain in place, the concrete shall be cut on a neat line to a minimum depth of 50 mm with a power driven saw before the concrete is removed.

Where concrete has been removed outside the roadway prism, the backfilled areas shall be graded to drain and blend in with the surrounding terrain.

Concrete to be removed which has portions of the same structure both above and below ground will be considered as concrete above ground for compensation.

Threaded rod anchors for existing anchored concrete barrier (Type K) shall be removed to 25 mm below the bridge deck surface, and the hole filled with rapid setting concrete. Existing voids around dowels shall be chipped back to sound concrete before filling void.

Rapid setting concrete shall conform to the provisions in "Refinishing Bridge Decks" of these special provisions.

Removing existing anchored Concrete Barrier (Type K) will be measured and paid for as Remove Concrete Barrier (Type K).

Full compensation for removing threaded rod anchors, repairing concrete surfaces around the existing threaded anchors, and filling voids with rapid setting concrete shall be considered as included in the contract unit price paid per meter for Remove Concrete Barrier (Type K) and no separate payment/additional compensation will be made/allowed therefor.

10-1.33 TREATED WOOD WASTE

This work includes handling, storing, transporting, and disposing treated wood waste.

Wood removed from metal beam guard railing is treated with creosote, pentachlorophenol, copper azole, copper boron azole, chromated copper arsenate, ammoniacal copper zinc arsenate, copper naphthenate, alkaline copper quaternary, or acid copper chromate. Treated wood waste must be disposed in an approved treated wood waste facility. A list of currently approved treated wood waste facilities may be viewed at:

http://www.dtsc.ca.gov/HazardousWaste/upload/TWW_Confirmed_Landfill_List.pdf

Manage treated wood waste under 22 CA Code of Regulations, Division 4.5, Chapter 34.

Prepare and submit safety and health work practices for handling treated wood waste for acceptance by the Engineer. Before submittal, the safety and health work practices must be reviewed and approved by an industrial hygienist certified in comprehensive practice by the American Board of Industrial Hygiene.

Provide water-resistant labels to clearly mark and identify treated wood waste. Labels on treated wood waste and accumulation areas must comply with 22 CA Code of Regulations, Division 4.5, Chapter 34, § 67386.5. The label must include:

1. In treated wood waste handler area:
 - 1.1. Caltrans, District number, Construction, contract number
 - 1.2. District office address
 - 1.3. Engineer's name, address, and telephone number
 - 1.4. Contractor's contact name and telephone number

Store treated wood waste before disposal using any of the following methods:

1. Elevated on blocks above a reasonably foreseeable run-on elevation and protected from precipitation
2. Placed in water-resistant containers designed for shipping or solid waste collection
3. Placed on a containment surface protected from run-on and precipitation

Prevent unauthorized access to treated wood waste using a secured enclosure such as a locked chain link fenced area or a lockable shipping container. The enclosure must be located within the project limits.

Dispose of treated wood waste within:

1. 90 days of generation if stored on blocks
2. 90 days of filling a container if containerized
3. 180 days of generation if stored on a containment surface

Before transporting treated wood waste, obtain agreement from the receiving facility that the treated wood waste will be accepted. Protect shipments of treated wood waste from loss and exposure to precipitation. Request a generator identification number from the Engineer at least 5 days before the first shipment. Each shipment must be accompanied by a shipping record such as a manifest or bill of lading that includes:

1. Caltrans, District number, Construction, contract number, generator identification number
2. District office address
3. Engineer name, address, and telephone number
4. Contractor contact name and telephone number
5. Receiving facility name and address
6. Waste description: Treated Wood Waste
7. Estimated quantity of shipment by weight or volume
8. Date of transport
9. Date of receipt
10. Weight of shipment as measured by the receiving treated wood waste facility

The shipping document must be at least a 4-part carbon or carbonless 8-1/2" x 11" form to allow retention of copies by the Engineer, transporter, and disposal facility. Submit a copy of each completed shipping record and weight receipt to the Engineer.

Resizing or segregating treated wood waste must be done at a location where debris from the operation including sawdust and chips can be contained. The debris must be collected and managed as treated wood waste.

Personnel who handle treated wood waste or may contact treated wood waste must receive training that includes:

1. All applicable requirements of 8 CA Code of Regulations
2. Procedures for identifying and segregating treated wood waste
3. Safe handling practices
4. Requirements of 22 CA Code of Regulations, Division 4.5, Chapter 34
5. Proper disposal methods

Full compensation for handling, storing, transporting, and disposing of treated wood waste, including preparation of safety and health work practices and personnel training, is included in the contract price paid for remove metal beam guard railing and no additional compensation will be allowed therefor.

10-1.34 CLEARING AND GRUBBING

Clearing and grubbing shall conform to the provisions in Section 16, "Clearing and Grubbing," of the Standard Specifications and these special provisions.

Vegetation shall be cleared and grubbed only within the excavation and embankment slope lines.

Vegetable growth from clearing and grubbing operations may be disposed of in embankments in conformance with the provisions in "Earthwork" of these special provisions.

Attention is directed to "Bird Protection" of these Special Provisions.

10-1.35 WATERING

Developing a water supply and applying watering shall conform to the provisions in Section 17, "Watering," of the Standard Specifications and these special provisions.

10-1.36 EARTHWORK

Earthwork shall conform to the provisions in Section 19, "Earthwork," of the Standard Specifications and these special provisions.

Constructing temporary roadway embankment for the detour roads shall be measured and paid for by the cubic meter for Embankment (Detour), and shall include all materials, tools, equipment, and incidentals, and for doing all the work necessary to construct temporary roadway embankment for the detour roads completely, as shown on the plans, specified in the specifications, and as directed by the Engineer.

Full compensation for furnishing, constructing, and removing the temporary shoring retaining wall shall be considered as included in the contract cubic meter prices paid for Embankment (Detour) and no additional compensation will be allowed therefor.

Roadway excavation for the construction of the detour roads shall be measured and paid for by the contract item for Roadway Excavation (Detour), and shall include all materials, tools, equipment, and incidentals, and for doing all the work necessary to complete roadway excavation for the detour roads completely, as shown on the plans, specified in the specifications, and as directed by the Engineer.

Structure backfill and roadway embankment, shown on the plans as Low Expansion Material, within the limits of the bridge abutments shall have an Expansion Index (EI) of less than 50 and a Sand Equivalent (SE) of greater than 20. The Expansion Index shall be determined in accordance with ASTM Designation: D 4829. The Sand Equivalent shall be determined in accordance with California Test 217.

Attention is directed to "Material Containing Aerially Deposited Lead" of these special provisions.

When a layer of specified material is not to be placed on the basement material, the finished grading plane shall not vary more than 30 mm above or below the grade established by the Engineer. The requirements for obtaining a relative compaction of 95 percent, as provided in the first 2 paragraphs in Section 19-5.03, "Relative Compaction (95 Percent)," of the Standard Specifications, shall not apply when a layer of specified material is not to be placed on the basement material.

The grading plane of embankments beneath structure approach slabs and beneath the thickened portion of sleeper slabs shall not project above the grade established by the Engineer.

Surplus excavated material not designated as hazardous waste due to aerially deposited lead shall become the property of the Contractor and shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Where a portion of the existing surfacing is to be removed, the outline of the area to be removed shall be cut on a neat line with a power-driven saw to a minimum depth of 50 mm before removing the surfacing. Full compensation for cutting the existing surfacing shall be considered as included in the contract price paid per cubic meter for roadway excavation and no additional compensation will be allowed therefor.

Reinforcement or metal attached to reinforced concrete rubble placed in embankments shall not protrude above the grading plane. Prior to placement within 0.6-m below the grading plane of embankments, reinforcement or metal shall be trimmed to no greater than 20 mm from the face of reinforced concrete rubble. Full compensation for trimming reinforcement or metal shall be considered as included in the contract prices paid per cubic meter for the types of excavation shown in the Engineer's estimate, or the contract prices paid for furnishing and placing imported borrow or embankment material, as the case may be, and no additional compensation will be allowed therefor.

Settlement periods are required for the bridge approach embankments at the bridges listed in the following table.

Surcharge embankments shall be constructed at or above the grading plane where listed in the following table:

Bridge Name or Number	Abutment Number	Bent Number	Surcharge Height (meters)	Settlement Period (days)
RIALTO AVENUE UC (WIDEN) BRIDGE NO. 54-0488	1 2		1.52 1.52	30 30
REDLANDS LOOP OH (WIDEN) BRIDGE NO. 54-0489	1 4		0 0	30 30
REDLANDS LOOP OH (N215 TO 2 ND STREET OFF-RAMP) BRIDGE NO. 54-1254S	1 4		0 0	30 30
RIALTO AVENUE UC (S215 TO 2 ND STREET OFF-RAMP) BRIDGE NO. 54-1255S	1 2		0 0	30 30
RIALTO AVENUE UNDERCROSSING (N215 TO 2 ND STREET ON-RAMP) BRIDGE NO. 54-1256K	1 2		0 0	30 30
SECOND ST UC (REPLACE) BRIDGE NO. 54-1259	1 2		1.52 1.52	30 30
THIRD STR UC (REPLACE) BRIDGE NO. 54-1260	1 2		1.52 1.52	30 30
THIRD STREET UC (TEMPORARY BRIDGE)				
N215 TO 5 TH STREET OFF-RAMP BRIDGE NO. 54-1251S	1 8		0 0	30 30
S215 TO 5 TH STREET OFF-RAMP BRIDGE NO. 54-1253K	3	—	0	30
5 TH STREET TO S215 ON-RAMP BRIDGE NO. 54-1252K	1		0	30
9 TH STREET OC (REPLACE) BRIDGE NO. 54-1222	1 4		0 0	30 30
BASELINE STREET OC (REPLACE) BRIDGE NO. 54-1223	1 4		0 0	30 30
SB BASELINE STREET ON-RAMP BRIDGE NO. 54-1224	1		0	30
SB BASELINE STREET OFF-RAMP BRIDGE NO. 54-1225	5		0	30
S259/S215 CONNECTOR (REPLACE) BRIDGE NO. 54-1239F	1 6		0 0	30 30

N215/N259 CONNECTOR BRIDGE NO. 54-1240G	1 4		0 0	30 30
16 TH STREET OC/OH (REPLACE) BRIDGE NO. 54-1241	1 7		0 0	30 30

The duration of the required settlement period at each location will be determined by the Engineer. The estimated duration of the settlement periods are listed in the tables of settlement data. The Engineer may order an increase or decrease in any settlement period. An ordered increase or decrease in any settlement period will result in an increase or decrease in the number of contract working days if the settlement period involved is considered to be the current controlling operation in conformance with the provisions in Section 8-1.06, "Time of Completion," of the Standard Specifications. Adjustments of contract time due to increases or decreases in settlement periods will be made by contract change order.

The removal of surplus embankment material placed as a settlement or surcharge embankment, including material removed to conform to the finished slope lines shown on the plans, will be paid for at the contract price per cubic meter for roadway excavation.

At the locations and to the limits shown on the plans, material below the bottom of bridge footings shall be removed and replaced with Class 2 aggregate base material in conformance with the placing and compacting requirements for structure backfill. The relative compaction shall be not less than 95 percent. Removal of the material will be measured and paid for by the cubic meter as structure excavation (bridge) and furnishing, placing, and compacting the replacement material will be measured and paid for by the cubic meter as structure backfill (bridge).

The geocomposite drain beyond the approach slab drainage at RIALTO AVENUE UC/N215 TO 2ND ST OFF-RAMP (Bridge Number 54-1255S), as shown on the plans shall conform to the details shown on the plans and the following:

- A. Attention is directed to "Engineering Fabrics" under "Materials" of these special provisions.
- B. Geocomposite drain shall consist of a manufactured core not less than 6.35 mm thick nor more than 50 mm thick with one or both sides covered with a layer of filter fabric that will provide a drainage void. The drain shall produce a flow rate, through the drainage void, of at least 25 liters per minute per meter of width at a hydraulic gradient of 1.0 and a minimum externally applied pressure of 168 kPa.
- C. A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished for the geocomposite drain certifying that the drain produces the required flow rate and complies with these special provisions. The Certificate of Compliance shall be accompanied by a flow capability graph for the geocomposite drain showing flow rates for externally applied pressures and hydraulic gradients. The flow capability graph shall be stamped with the verification of an independent testing laboratory.
- D. Filter fabric for the geocomposite drain shall conform to the provisions for fabric for underdrains in Section 88, "Engineering Fabrics," of the Standard Specifications.

- E. The manufactured core shall be either a preformed grid of embossed plastic, a mat of random shapes of plastic fibers, a drainage net consisting of a uniform pattern of polymeric strands forming 2 sets of continuous flow channels, or a system of plastic pillars and interconnections forming a semirigid mat.
- F. The core material and filter fabric shall be capable of maintaining the drainage void for the entire height of geocomposite drain. Filter fabric shall be integrally bonded to the side of the core material with the drainage void. Core material manufactured from impermeable plastic sheeting having nonconnecting corrugations shall be placed with the corrugations approximately perpendicular to the drainage collection system.
- G. The geocomposite drain shall be installed with the drainage void and the filter fabric facing the embankment. The fabric facing the embankment side shall overlap a minimum of 75 mm at all joints and wrap around the exterior edges a minimum of 75 mm beyond the exterior edge. If additional fabric is needed to provide overlap at joints and wrap-around at edges, the added fabric shall overlap the fabric on the geocomposite drain at least 150 mm and be attached thereto.
- H. Should the fabric on the geocomposite drain be torn or punctured, the damaged section shall be replaced completely or repaired by placing a piece of fabric that is large enough to cover the damaged area and provide a minimum 150-mm overlap.
- I. Plastic pipe shall conform to the provisions for edge drain pipe and edge drain outlets in Section 68-3, "Edge Drains," of the Standard Specifications.
- J. Treated permeable base to be placed around the slotted plastic pipe at the bottom of the geocomposite drain shall be cement treated permeable base conforming to the provisions for cement treated permeable base in Section 29, "Treated Permeable Bases," of the Standard Specifications and these special provisions.
- K. The treated permeable base shall be enclosed with a high density polyethylene sheet or PVC geomembrane, not less than 250 μ m thick, which is bonded with a suitable adhesive to the concrete and geocomposite drain. Surfaces to receive the polyethylene sheet shall be cleaned before applying the adhesive. The treated permeable base shall be compacted with a vibrating shoe type compactor.

If structure excavation or structure backfill for bridges is not otherwise designated by type and payment for the structure excavation or structure backfill has not otherwise been provided for in the Standard Specifications or these special provisions, the structure excavation or structure backfill will be measured and paid for as structure excavation (bridge) or structure backfill (bridge), respectively.

Full compensation for conforming to the requirements for Low Expansion Material as specified in these special provisions shall be considered as included in the contract prices paid for the various items of work and no additional compensation will be allowed therefor.

Full compensation for the drainage system behind retaining walls at Rialto Avenue UC – N215 To 2nd St Off-Ramp (Br. No. 54-1255S) including geocomposite drain, plastic pipe, drainage pads, treated permeable base and filter fabric shall be considered as included in the contract price paid per cubic meter for structural concrete, retaining wall shown in the Engineer's Estimate, and no additional compensation will be allowed therefor.

10-1.37 TEMPORARY SHORING

The temporary shoring at Retaining Wall No. 137 shall conform to the provisions in Section 19, "Earthwork," and Section 50, "Prestressing Concrete," of the Standard Specifications, the Railroad Agreement included in SECTION 13 and these special provisions.

The Contractor shall submit complete working drawings and calculations for each installation of the temporary shoring to the Engineer in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The working drawings shall include details of the temporary shoring construction, maintenance and removal operations showing the methods and sequences of installation and removal and the equipment to be used.

The working drawings and calculations shall be stamped and signed by an engineer who is registered as a Civil Engineer. The Contractor shall allow the Engineer 9 weeks to review the drawings after a complete set has been received. Approval by the Engineer of the detailed plans for the temporary shoring will be contingent upon the plans being satisfactory to the railroad company involved. Six sets of working drawings and 2 copies of the design calculations shall be submitted.

Working drawings shall be either 279 mm x 432 mm or 559 mm x 864 mm in size. Each drawing and calculation sheet shall include the State assigned designations for the contract number, retaining wall number, full name of the structure as shown on the contract plans, and District-County-Route-Post Mile. The design firm's name, address, and telephone number shall be shown on the working drawings. Each sheet shall be numbered in the lower right hand corner and shall contain a blank space in the upper right hand corner for future contract sheet numbers.

The contract lump sum price paid for the temporary shoring at Retaining Wall No. 137 shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in designing, constructing, maintaining, and removing the temporary shoring, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.38 EARTH RETAINING STRUCTURES

Earth retaining structures, consisting of Mechanically Stabilized Embankment, shall conform to the details shown on the plans and these special provisions.

Attention is directed to "Precast Concrete Quality Control" of these special provisions.

At the Contractor's option, one of the following acceptable alternative earth retaining systems may be constructed:

Proprietary Earth Retaining System	Address and Phone Number
Reinforced Earth (1.52 m cruciform concrete face panels; 1.52 m square concrete face panels)	The Reinforced Earth Company 1 Orchard Road, Suite 220 Lake Forest, CA 92630 (949) 587-3060 www.reinforcedearth.com
Retained Earth (1.52 m square concrete face panels)	Foster Geotechnical 1660 Hotel Circle North, Suite 304 San Diego, CA 92108 (619) 688-2400 www.lbfoster.com
MSE Plus (1.52 m square concrete face panels)	SSL 4740 Scotts Valley Drive, Suite 'E' Scotts Valley, CA 95066 (831) 430-9300

The size of the concrete facing panels shall match the facing panels for MSE walls in contract 08-007174 (Segment 3). Architectural Surface (Texture Concrete) for facing panels shall conform to the contract 08-007174 (Segment 3) referee samples located at the construction office.

Only one type of earth retaining system shall be used at any one location.

The above list of acceptable alternative earth retaining systems has been selected from the Department's current list of prequalified earth retaining systems and is limited only to those systems determined to have characteristics suitable for this project. Among the alternatives shown, some systems may be proprietary.

The list of prequalified earth retaining systems has been developed from data previously furnished by suppliers or manufacturers of each system. Approval of additional earth retaining systems is contingent on the system meeting the full range of parameters for which prequalification is required. The prequalification requirements can be obtained from the Office of Structure Design, Mail Station 9-2/9I, 1801 30th Street, Sacramento, CA 95816.

WORKING DRAWINGS

If the Contractor elects to use a proprietary earth retaining system from the list of acceptable alternative systems, the Contractor shall submit complete working drawings for each installation of the system to the Office of Structure Design (OSD) in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. For initial review, 4 sets of drawings shall be submitted. After review between 6 and 12 sets, as requested by the Engineer, shall be submitted to OSD for final approval and use during construction.

Working drawings shall be 279 mm x 432 mm in size, and each drawing and calculation sheet shall include the State assigned designations for the contract number, bridge number, full name of the structure as shown on the contract plans, and District-County-Route-Kilometer Post. The design firm's name, address, and phone number shall be shown on the working drawings. Each sheet shall be numbered in the lower right hand corner and shall contain a blank space in the upper right hand corner for future contract sheet numbers.

The Contractor shall verify the existing ground elevations at the site before preparing the working drawings. The working drawings shall contain all information required for the proper construction of the system at each location including existing ground line at face of wall as verified at the site and any required revisions or additions to drainage systems or other facilities.

The working drawings shall include "General Notes" that contain design parameters, material notes, and wall construction procedures. The working drawings and calculations shall be stamped and signed by an engineer who is registered as a Civil Engineer in the State of California. The Contractor shall allow the Engineer 30 days to review the drawings after a complete set has been received.

Unless otherwise specified, at the completion of each structure for which working drawings were submitted, and if the work detailed in these working drawings is permanent, the Contractor shall submit to the Engineer one set of corrected as-built prints 279 mm x 432 mm in size and on 75 g/m² (minimum) bond paper, showing as built conditions. As-built drawings that are common to more than one structure shall be submitted for each structure.

MATERIALS

Earthwork

Excavation and backfill shall conform to the details shown on the plans, the provisions in Section 19, "Earthwork," of the Standard Specifications, and these special provisions.

Structure backfill for earth retaining structures with soil reinforcement shall be free of organic material and substantially free of shale or other soft materials of poor durability. Structure backfill shall not contain slag aggregate or recycled materials such as glass, shredded tires, portland cement concrete rubble, asphaltic concrete rubble, or other unsuitable material as determined by the Engineer.

Structure backfill for earth retaining structures with soil reinforcement shall conform to the following requirements:

Gradation Requirements		
Sieve Size	Percentage Passing	California Test
159 mm	100	202
75 mm	78 - 100	202
4.75 mm	----	202
600 µm	0 - 60	202
75 µm	0 - 15	202

Property Requirements		
Test	Requirement	California Test
Sand Equivalent	12 minimum	217
Plasticity Index	6 maximum	204
Minimum Resistivity	2000 ohm-cm	643
Chlorides	< 250 ppm	422
Sulfates	< 500 ppm	417
pH	5.5 to 10.0	643

If 12 percent or less passes the No. 75 µm sieve and 50 percent or less passes the No. 4.75 mm sieve, the Sand Equivalent and Plasticity Index requirements shall not apply.

Permeable material shall be used for the portion of the structure backfill for earth retaining structures with soil reinforcement within the limits shown on the plans. Permeable material shall be Class 1, Type B, conforming to the provisions in Section 68-1.025, "Permeable Material," of the Standard Specifications.

Permeable material for earth retaining structures with metallic soil reinforcement shall conform to the following requirements:

Property Requirements		
Test	Requirement	California Test
Minimum Resistivity	2000 ohm-cm	643
Chlorides	< 250 ppm	422
Sulfates	< 500 ppm	417
pH	5.5 to 10.0	643

Water used for earthwork or dust control within 150 meters of earth retaining structures with metallic soil reinforcement shall conform to the provisions for water in Section 90-2.03, "Water," of the Standard Specifications.

Concrete

Concrete used in precast and cast-in-place reinforced concrete members of earth retaining structures shall conform to the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications, and these special provisions.

The concrete leveling pads for the Mechanically Stabilized Embankment (MSE) system shall conform to the provisions in Section 90-10, "Minor Concrete," of the Standard Specifications.

Reinforcement

Reinforcement shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

Galvanizing

Soil reinforcement, connecting elements, and other steel components that are in contact with the earth shall be galvanized in conformance with the provisions in Section 75-1.05, "Galvanizing," of the Standard Specifications.

Inspection Elements

If a proprietary alternative system is selected, inspection elements representative of the particular soil reinforcement shall be furnished in the same number and approximate location as shown on the plans for the MSE system.

When metallic soil reinforcement is used, the threaded end of the inspection wire may be formed before or after galvanizing. The end 100 mm of the wire shall be coated with two applications of an approved unthinned commercial quality zinc-rich primer (organic vehicle type). The threaded end of the wire shall be encapsulated with corrosion inhibiting, mastic filled, round vinyl enclosure secured with a nylon tie as shown on the plans. If the threaded end is galvanized after threading, the threads shall be cleaned before painting. There shall be no damage to the unthreaded portion of the galvanized inspection wire.

Drainage System

The drainage system shall conform to the details shown on the plans and these special provisions.

Corrugated steel pipe shall conform to the provisions in Section 66, "Corrugated Metal Pipe," of the Standard Specifications.

Perforated steel pipe underdrains and underdrain outlets and risers shall conform to the provisions in Section 68-1, "Underdrains," of the Standard Specifications.

The class of rock used for rock slope protection at drain pipe outlets shall be No. 3 Backing and shall conform to the provisions in Section 72-2, "Rock Slope Protection," of the Standard Specifications.

Filter fabric shall be ultraviolet (UV) ray protected, and shall conform to the provisions for fabric for underdrains in Section 88-1.03, "Filter Fabric," of the Standard Specifications and these special provisions.

Adhesive for bonding filter fabric to concrete panels shall be commercial grade.

Soil Reinforcement

Soil reinforcement shall conform to the details shown on the contract plans, the approved working drawings, the preapproved proprietary system details, and these special provisions.

MW70 and MW130 steel wire shall conform to the requirements in ASTM Designation: A 82/A 82M. The welded wire mat shall conform to the requirements in ASTM Designation: A 185/A 185M. MD70 and MD130 deformed steel wire may be substituted for MW70 and MW130 steel wire, respectively. The welded wire mat utilizing deformed steel wire shall conform to the requirements in ASTM Designation: A 496/A 496M and ASTM Designation: A 497/A 497M.

The button on button-head wires shall conform to the provisions in Section 50-1.05, "Prestressing Steel," of the Standard Specifications.

The coupler at the wire mat connection shall be a seamless steel sleeve. The coupler shall be applied over the button-head wires and swaged by means of a hydraulic press. The coupler shall develop the minimum tensile strength of the wire without exceeding a total slip of the wires of 5.0 mm.

Sample button-head wire and coupler connectors shall develop the minimum tensile requirements for MW70 and MW130 steel wire in ASTM Designation: A 82/A 82M without exceeding a total slip of the wires of 5.0 mm when tested in conformance with the provisions for tension testing of round wire samples in ASTM Designation: A 370. When MD70 and MD130 deformed steel wire are substituted, samples shall develop the minimum tensile requirements contained in ASTM Designation: A 496/A 496M. An independent testing laboratory shall perform button-head wire and coupler connection testing. Samples shall consist of 2 button-head wires each 600 mm long connected by a swaged coupler.

Prior to the start of wall construction, the Contractor shall furnish test results to the Engineer from tension and slip tests conducted on 6 proposed button-head wire and coupler connections. Failure of any of the proposed button-head wire and coupler connector samples to meet the slip and tensile strength requirements herein shall require the connection be redesigned by the Contractor.

No installation of face panels shall be allowed until the Contractor has successfully completed tension and slip testing for proposed button-head wire and coupler connectors.

During wall construction, the Contractor shall furnish test results to the Engineer from tension and slip testing of 4 samples of production button-head wire and coupler connections for each lot of 500 individual mat wire connections incorporated into the work. Production testing shall consist of testing each of the 4 sample connections for both slip and tensile requirements herein. If 2 or more of the production samples fail to meet slip or tensile test requirements, the entire lot represented by these samples shall be rejected. If one of the production samples fails to meet slip or tensile test requirements, an additional 4 samples shall be tested. Should any of the additional samples fail to meet the slip or tensile requirements, the entire lot represented by these samples shall be rejected.

Splicing of the welded wire mat along its length shall be by mechanical coupler that shall develop the minimum tensile strength of the wire. The mechanical coupler shall be approved by the Engineer.

Geogrid soil reinforcement roll identification, storage, and handling shall be in accordance with ASTM Designation: D 4873, and as specified in the preapproved proprietary details. The geogrid shall be shipped and stored such that the material is not placed directly on the ground. The geogrid shall be covered and protected at all times during shipment and storage such that it is fully protected from UV radiation including sunlight, site construction damage, precipitation, chemicals, flames including welding sparks, temperatures less than -29°C or greater than 60°C, or other conditions that may damage the physical property values of the geogrid. The Contractor shall prevent foreign materials from coming into contact with or affixing to the geogrid.

Miscellaneous

Resin bonded cork for horizontal joints shall conform to the requirements in ASTM Designation: D 1752, Type II, with a compressive load of not less than 690 kPa.

Pipe for the pipe pin shall conform to the requirements in ASTM Designation: A 53/A 53M, Standard weight, except the amount of the zinc coating per square meter of actual surface shall average not less than 610 g and no individual specimen shall be less than 550 g.

CONSTRUCTION

Earth retaining structures shall be constructed to the lines, grades, and details shown on the plans, and shall conform to these special provisions.

Earthwork

The foundation for the structure shall be graded level for a width equal to the length of soil reinforcement elements plus 300 mm or as shown on the contract plans. The foundation material shall be compacted to a relative compaction of not less than 95 percent. The Engineer shall approve the compacted foundation area prior to commencement of wall construction.

The Contractor shall remove unsuitable material as determined and directed by the Engineer. This work shall be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Structure backfill material shall be placed and compacted simultaneously with the erection of the facing panels. Placement and compaction shall be accomplished without distortion of the soil reinforcement or displacement of facing panels. Structure backfill at the front of the wall shall be completed prior to backfilling more than 4 m above the bottom of the lowermost face element.

Vertical and horizontal alignment tolerances of panels shall not exceed 20 mm when measured along a 3 m straight edge. The maximum allowable offset in any panel joint shall not exceed 20 mm.

Structure backfill for earth retaining structures with soil reinforcement shall be compacted to a relative compaction of not less than 95 percent.

A relative compaction of not less than 95 percent shall be obtained for embankment under earth retaining structures with soil reinforcement within the limits established by inclined planes sloping 1:1.5 (vertical:horizontal) out and down from lines 0.3 m outside the bottom limits of the structure, including permeable material when required.

Soil reinforcement shall be tensioned in the direction perpendicular to the wall face with enough force to remove any slack in the connection or in the soil reinforcement itself. Soil

reinforcement shall be secured in place to prevent movement during placement of additional soil reinforcement and structure backfill until the initial lift of structure backfill is compacted.

Geogrid soil reinforcement shall be placed in full-length sections.

Soil reinforcement shall be covered with structure backfill during the same work shift that it is placed.

Placement and compaction of structure backfill shall begin 300 mm from the back face of wall panels and progress towards the free end of the soil reinforcement. Compaction equipment shall be operated parallel to the wall facing. The remaining width of backfill behind the wall panels shall be placed and compacted after soil reinforcement has been covered to a depth of 150 mm.

Sheepsfoot or grid-type rollers shall not be used for compacting material within the limits of the soil reinforcement. Hand-held or hand-guided compacting equipment shall be used to compact structure backfill material within one meter of the facing panels.

Construction equipment shall not be operated directly on the soil reinforcement. A layer of structure backfill material not less than 150 mm in thickness shall be maintained between the soil reinforcement and construction equipment of any type.

Structure backfill material for earth retaining structures with geogrid soil reinforcement shall be placed in lifts not to exceed 150 mm where hand-operated compacting equipment is used and 200 mm where heavy compaction equipment is used.

At each level of the soil reinforcement the structure backfill shall be constructed to a plane 50 mm above the elevation of the soil reinforcement connection and shall start one meter from the back of the face panel and extend for at least the remaining length of soil reinforcement. This grading shall be complete before placing the next layer of soil reinforcement.

Permeable material and filter fabric shall be placed along with structure backfill as shown on the plans. Permeable material shall be placed in layers not exceeding 0.6 m in thickness. Compaction of the permeable material for the drainage system outside the limits of the soil reinforcement is not required, and equipment shall not be operated directly on the permeable material or filter fabric. If a sloped layer of permeable material is placed to facilitate the work or to satisfy safety considerations, the vertical limits of permeable material shall remain unchanged and the thickness of the layer of permeable material shall be measured normal to the slope.

The Contractor shall grade the reinforced backfill to rapidly drain away from the wall face at the end of each work shift. Berms or ditches shall be provided to direct runoff away from the wall site. The Contractor shall not allow surface runoff from adjacent areas to enter the wall construction site.

Filter Fabric

Filter fabric shall be placed at the locations and in conformance with the details shown on the plans and these special provisions.

Immediately prior to placing filter fabric, the subgrade to receive the filter fabric shall conform to the compaction and elevation tolerance specified for the material involved and shall be free of loose or extraneous material and sharp objects that may damage the filter fabric during installation.

Concrete panel surfaces to receive filter fabric shall be dry and thoroughly cleaned of dust and deleterious materials.

Filter fabric shall be handled and placed in conformance with the manufacturer's recommendations.

Filter fabric shall be stretched, aligned, and placed in a wrinkle-free manner.

Adjacent borders of filter fabric shall be stitched or overlapped from 300 mm to 450 mm. The preceding roll shall overlap the following roll in the direction the material is being spread or shall be stitched. When filter fabric is joined by stitching it shall be stitched with yarn of a contrasting color. The size and composition of the yarn shall be as recommended by the filter fabric manufacturer. The stitches shall number 2 to 3 per centimeter of seam.

If the filter fabric is damaged during installation, it shall be repaired by placing a piece of filter fabric that is large enough to cover the damaged area and that meets the overlap requirement.

During spreading of the permeable material, a minimum of 150 mm of the material shall be maintained between the filter fabric and the Contractor's equipment. Where structure backfill material is to be placed on filter fabric, a minimum of 450 mm of structure backfill material shall be maintained between the filter fabric and the Contractor's equipment. Equipment or vehicles shall not be operated or driven directly on filter fabric.

Concrete

Concrete for the leveling pads shall be placed at least 24 hours prior to erecting face panels.

Exposed surfaces of precast members shall receive a fractured rib texture conforming to the provisions in "Architectural Treatment" of these special provisions

After placement of an inspection element and placement of backfill to a level at least 0.6 m above the inspection element, the void in the face panel shall be dry packed with mortar as shown on the plans. Dry pack shall conform to the provisions in Section 51-1.135, "Mortar," of the Standard Specifications, except that the proportion of cementitious material to sand shall be that required to achieve a 28-day mortar compressive strength of 7 MPa to 10 MPa.

Proprietary Earth Retaining Systems

If the Contractor elects to construct one of the acceptable proprietary alternative earth retaining systems, the structure shall be constructed to the lines and grades shown on the plans. Vertical and horizontal alignment shall be checked at every course throughout the erection process. The construction shall include a drainage system where shown on the plans, and shall conform to the details shown on the approved working drawings, approved proprietary system details, and these special provisions.

The Contractor shall supply a Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications stating the supplied material meets the respective index criteria set forth when the proprietary alternative earth retaining system was prequalified by the Department, as measured in accordance with all test methods and standards specified in the Standard Specifications, these special provisions, and the approved working drawings.

A qualified representative of the proprietary earth retaining system manufacturer shall be present during erection and backfill of the first 3 meters of height of the entire length of the wall and shall be available during any remaining installations. The manufacturer's representative shall not be an employee of the Contractor.

Alternative earth retaining structures shall be constructed to accommodate the wall-mounted lighting, the wall mounted drainpipe, and the panels for future drainage inlets, as shown on the plans.

The top of wall profile of alternative earth retaining systems shall conform to the profile shown on the plans. The bottom of wall elevations or face panels shall be at or below the elevations shown on the plans. The height and length to be used for any system shall be the minimums for that system that will effectively retain the earth behind the structure for the

loading conditions and the contours, profile, or slope lines shown on the plans. The length of soil reinforcement for any system shall be not less than that shown on the plans. In addition, if the plans or special provisions indicate limiting parameters for alternative systems, the system shall conform to those parameters.

The top of face panels, assuming no leveling pad settlement, shall be covered by the coping lip or concrete barrier slab lip at a minimum of 170 mm.

The top level of soil reinforcement shall be placed parallel to the top of the concrete panel at a distance below the top of the wall as shown on the plans. The top level of soil reinforcement shall also be (1) placed a minimum of 75 mm below the bottom of the barrier slab lip or the bottom of the concrete gutter behind coping and (2) placed a minimum of 125 mm below the top edge of the concrete panel.

MEASUREMENT AND PAYMENT

Earth retaining structures (Mechanically Stabilized Embankment) will be measured and paid for by the square meter. Regardless of the type of earth retaining structure actually constructed, the square meter area for payment will be based on the length and vertical height of each section of system shown on the plans that was or would have been constructed. The vertical height of each section will be taken as the difference in elevation on the outer face from the bottom of the lowermost face element to the top of wall profile.

The contract price paid per square meter for earth retaining structure (Mechanically Stabilized Embankment) at each location shown on the plans shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the earth retaining structure and inspection elements, including earthwork, leveling pad, bearing pads, architectural treatment and drainage systems, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract price paid per cubic meter for structural concrete, barrier slab shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the barrier slab, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for furnishing and testing sample mechanical connectors shall be considered as included in the contract price paid per square meter for earth retaining structure (Mechanically Stabilized Embankment), and no separate payment will be made therefor.

Full compensation for revisions to the barrier support, drainage system, or other facilities made necessary by the use of an alternative earth retaining system shall be considered as included in the contract price paid per square meter for earth retaining structure, and no separate payment will be made therefor.

10-1.39 SAMPLING AND REMOVAL OF ASBESTOS CONTAINING MATERIALS

Asbestos containing materials (ACM), as defined in Section 1529, "Asbestos," of the Construction Safety Orders, Title 8, of the California Code of Regulations are/are suspected to be present in the structure proposed for demolition or renovation.

In compliance with Standard Specifications Section 7-1.01F, the Contractor shall notify the South Coast Air Quality Management District (AQMD) as required by the National Emission Standards for Hazardous Air Pollutants (NESHAP) 40 CFR Part 61, Subpart M, California Health and Safety Code section 39658(b)(1), and the California Air Resources Board

regulations. A copy of the notification form and attachments shall be provided to the Engineer prior to submittal. Notification shall take place a minimum of 10 working days prior to starting demolition or renovation activities.

ASBESTOS SURVEY

Asbestos-containing material was detected at 6th Street Off-ramp Overcrossing and 13th Street Southbound Off-ramp Overcrossing (Category 1 Non-Friable Materials) in railing shims. All other suspected structural members have tested negative for asbestos-containing material. Portions of the survey report are included in the "Materials Information Handout." The complete report entitled "LIMITED ASBESTOS SURVEY and LIMITED SOIL SURVEY" is available for inspection at the Department of Transportation, Construction Office, located at 464 West 4th Street, San Bernardino, CA 92401.

ASBESTOS SAMPLING AND ANALYSIS WORKPLAN

REMOVAL OF ASBESTOS CONTAINING MATERIAL

Removal and management of ACM shall be performed by a contractor who is registered pursuant to Section 6501.5 of the Labor Code and certified pursuant to Section 7058.6 of the Business and Professions Code. Asbestos removal shall conform to Cal/OSHA requirements in Title 8 Sections 1529 and 341. All non-friable ACM shall be removed and handled to prevent breakage. Non-friable ACM such as asbestos cement pipe shall be disposed of to a landfill facility permitted to take regulated asbestos containing material. The removal of ACM encased in concrete or other similar structural material is not required prior to demolition, but such material shall be adequately wetted whenever exposed during demolition. Packaging, storage, transporting, and disposing of ACM, shall conform to Title 22, Division 4.5, Chapters 11, 12 and 13 of the California Code of Regulations. The handling, removal, transportation, and disposal of ACM shall result in no visible dust. The Contractor shall have a water truck available at all times while performing earthwork, excavation or demolition activities in work areas containing ACM.

Asbestos removal procedures shall include, but not be limited to:

- A. Installing asbestos warning signs at perimeters of abatement work areas.
- B. Wetting asbestos materials with sprayers.
- C. Containing large volumes of asbestos materials in disposal bins for temporary storage until removed from the site.
- D. Providing manifests for waste disposal upon completion for the Engineer to sign.
- E. Transporters registered to transport hazardous waste in the State of California in accordance with the provisions of Chapter 6.5, Division 20 of the Health and Safety Code and Title 22 of the California Code of Regulations, Division 4.5.
- F. Disposing of asbestos materials at a permitted disposal facility, which accepts such materials.
- G. Working in accordance with Federal, State, and Local requirements for asbestos work.

All vehicles used to transport ACM shall be marked as specified below, or an equivalent warning:

DANGER
ASBESTOS DUST HAZARD
AUTHORIZED PERSONNEL ONLY

Handling

The Contractor shall comply with CCR Title 22, Division 4.5, Chapter 12, Article 3 requirements for the removal of material containing asbestos prior to and during demolition and alteration, and shall place such removed material in approved plastic containers (double ply, 0.15 mm minimum thickness, plastic bags) with caution labels affixed to bags. Such caution labels shall have conspicuous, legible lettering, which spells out the following, or equivalent warning:

CAUTION
CONTAINS ASBESTOS FIBERS
BREATHING ASBESTOS DUST MAY
CAUSE SERIOUS BODILY HARM

At the option of the Contractor, the removed materials containing asbestos may be placed directly into a covered roll off or drop box, which shall have the same caution label, affixed on all sides.

Transporting

All haulers of friable asbestos containing material shall be currently registered with the State Department of Toxic Substances Control (DTSC), and shall have a U.S. Environmental Protection Agency Identification Number (U.S. EPA I.D. Number). All vehicles used to transport hazardous waste material shall have affixed to the vehicle a valid registration issued by DTSC.

Disposal

The Engineer will obtain the required EPA generator identification numbers, and will sign the hazardous waste manifests for disposal of friable asbestos containing material. The Contractor shall dispose of friable and non-friable waste containing asbestos at a disposal facility permitted to accept such material and that meets all the requirements specified by Federal, State, and Local regulations. The Contractor shall notify the proper authorities at the disposal site in advance of delivery of asbestos containing material to the disposal site. The Contractor shall conduct additional sampling deemed necessary by the owner of the disposal facility for acceptance of the material. This sampling shall be at the Contractor's expense.

If, as determined by the Engineer, the disposal of asbestos in the project area delays the current controlling operation, the delay will be considered a right of way delay and the Contractor will be compensated for the delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

ASBESTOS COMPLIANCE PLAN

The Contractor shall prepare an Asbestos Compliance Plan (ACP) to prevent or minimize exposure to asbestos. Attention is directed to Title 8, California Code of Regulations, Construction Safety Orders, Section 5192 (b) and Section 1529, "Asbestos", Occupational Safety and Health Guidance Manual published by the National Institute of Occupational Safety and Health (NIOSH) and the USEPA for elements of the ACP. The ACP shall contain as a minimum

but not be limited to: identification of key personnel for the project, job hazard analysis for work assignments, summary of risk assessment, personal protective equipment, delineation of work zones on-site, decontamination procedures, general safe work practices, security measures, emergency response plans and worker training. The ACP shall be approved by the Contractor's Certified Industrial Hygienist before submission to the Engineer for review and acceptance. The plan shall be submitted to the Engineer at least 15 working days prior to beginning work in areas containing or suspected to contain asbestos.

TRAINING

Prior to performing work in areas containing or suspected to contain asbestos, personnel who have no prior training or are not current in their training status, including State personnel, shall complete a safety training program provided by the Contractor, which meets the requirement of Title 8, California Code of Regulations, Section 1529 and Section 5192 (b)(4)(B), and 29 CFR 1910 and 1926. The Contractor shall provide a written certification of completion of safety training to the Engineer for trained personnel prior to performing work in areas containing or suspected to contain asbestos.

EQUIPMENT AND MEDICAL SURVEILLANCE

The Contractor shall provide personnel protective equipment, training, and medical surveillance required by the Contractor's Asbestos Compliance Plan to State personnel. The number of State personnel will be determined by the Engineer.

PAYMENT

The contract lump sum price paid for Asbestos Compliance Plan shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparing the Asbestos Compliance Plan, including paying the Certified Industrial Hygienist, and for providing personal protective equipment, training and medical surveillance, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for asbestos containing materials removal, furnishing all labor, materials, tools, equipment and incidentals, containment, transporting and disposal of asbestos containing materials, shall be considered as included in the items of work involved as specified in the Standard Specifications and these special provisions, and as directed by the Engineer, as no additional compensation will be allowed therefor.

10-1.40 MATERIAL CONTAINING AERIALLY DEPOSITED LEAD

Earthwork involving material containing aerially deposited lead shall conform to the provisions in Section 19, "Earthwork" of the Standard Specifications and these special provisions.

Attention is directed to "Aerially Deposited Lead" of these special provisions.

Type Y-1 material contains aerially deposited lead in average concentrations of 0.5 mg/L or less extractable lead (based on a modified waste extraction test using deionized water as the extractant) and 1411 mg/kg or less total lead. Type Y-1 material exists between 0 meter and 4.6 meter, measured horizontally from the edges of existing pavement, from Station 104+20 to Station 140+00, and from a depth of 0 meter to 0.9 meter below existing grade as shown on the plans. This material shall be placed as shown on the plans, unless otherwise directed by the Engineer, and covered with a minimum 0.6-m layer of non-hazardous soil or pavement. This material is hazardous waste regulated by the State of California that may be reused as permitted under the Variance of the California Department of Toxic Substances Control (DTSC) provided that the lead contaminated soil is placed a minimum of 1.5 m above the maximum water table

elevation and covered with at least 0.3 m of non-hazardous soil. Temporary surplus material may be generated on this project due to the requirements of stage construction. Temporary surplus material shall not be transported outside the State right of way. In order to conform to the requirements of these provisions it may be necessary to stockpile material for subsequent stages, to construct some embankments out of stage, or to handle temporary surplus material more than once.

LEAD COMPLIANCE PLAN

The Contractor shall prepare a project specific Lead Compliance Plan to prevent or minimize worker exposure to lead while handling material containing aerially deposited lead. Attention is directed to Title 8, California Code of Regulations, Section 1532.1, "Lead," for specific California Department of Industrial Relations, Division of Occupational Safety and Health (Cal-OSHA) requirements when working with lead.

The Lead Compliance Plan shall contain the elements listed in Title 8, California Code of Regulations, Section 1532.1(e)(2)(B). Before submission to the Engineer, the Lead Compliance Plan shall be approved by an Industrial Hygienist certified in Comprehensive Practice by the American Board of Industrial Hygiene. The plan shall be submitted to the Engineer for review and acceptance at least 15 days prior to beginning work in areas containing aerially deposited lead.

The Lead Compliance Plan shall include perimeter air monitoring incorporating upwind and downwind locations as shown on the plans or as approved by the Engineer. Monitoring shall be by personal air samplers using National Institute of Safety and Health Method 7082. Sampling shall achieve a detection limit of $0.05 \mu\text{g}/\text{m}^3$ of air per day. Daily monitoring shall take place while the Contractor clears and grubs and performs earthwork operations. A single representative daily sample shall be analyzed for lead. Results shall be analyzed and provided to the Engineer within 24 hours. Average lead concentrations shall not exceed $1.5 \mu\text{g}/\text{m}^3$ of air per day. If concentrations exceed this level the Contractor shall stop work and modify the work to prevent release of lead. Monitoring shall be done under the direction of, and the data shall be reviewed by and signed by a Certified Industrial Hygienist.

The Contractor shall not work in areas containing aerially deposited lead within the project limits, unless authorized in writing by the Engineer, until the Engineer has accepted the Lead Compliance Plan.

Prior to performing work in areas containing aerially deposited lead, personnel who have no prior training or are not current in their training status, including Department personnel, shall complete a safety training program provided by the Contractor. The safety training program shall meet the requirements of Title 8, California Code of Regulations, Section 1532.1, "Lead."

Personal protective equipment, training, and washing facilities required by the Contractor's Lead Compliance Plan shall be supplied to Department personnel by the Contractor. The number of Department personnel will be three.

The Engineer will notify the Contractor of acceptance or rejection of the submitted or revised Lead Compliance Plan not more than 10 days after submittal of the plan.

The contract lump sum price paid for Lead Compliance Plan shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in preparing the Lead Compliance Plan, including paying the Certified Industrial Hygienist, and for providing personal protective equipment, training and medical surveillance, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

EXCAVATION AND TRANSPORTATION PLAN

Within 15 days after approval of the contract, the Contractor shall submit 3 copies of an Excavation and Transportation Plan to the Engineer. The Engineer will have 7 days to review the plan. If revisions are required, as determined by the Engineer, the Contractor shall revise and resubmit the plan within 7 days of receipt of the Engineer's comments. The Engineer will have 7 days to review the revisions. Upon the Engineer's approval of the plan, 3 additional copies incorporating the required changes shall be submitted to the Engineer. Minor changes to or clarifications of the initial submittal may be made and attached as amendments to the Excavation and Transportation Plan. In order to allow construction to proceed, the Engineer may conditionally approve the plan while minor revisions or amendments are being completed.

The Contractor shall prepare the written, project specific Excavation and Transportation Plan establishing the procedures the Contractor will use to comply with requirements for excavating, stockpiling, transporting, and placing (or disposing) of material containing aurally deposited lead. The plan shall conform to the regulations of the DTSC and Cal-OSHA. The sampling and analysis portions of the Excavation and Transportation Plan shall meet the requirements for the design and development of the sampling plan, statistical analysis, and reporting of test results contained in USEPA, SW 846, "Test Methods for Evaluating Solid Waste," Volume II: Field Manual Physical/Chemical, Chapter Nine, Section 9.1. The plan shall contain, but not be limited to the following elements:

- A. Excavation schedule (by location and date),
- B. Temporary locations of stockpiled material,
- C. Sampling and analysis plans for areas after removal of a stockpile,
 - 1. Location and number of samples,
 - 2. Analytical laboratory,
- D. Dust control measures,
- E. Air monitoring,
 - 1. Location and type of equipment,
 - 2. Sampling frequency,
 - 3. Analytical laboratory,
- F. Transportation equipment and routes,
- G. Method for preventing spills and tracking material onto public roads,
- H. Truck waiting and staging areas,
- L. Example of Bill of Lading to be carried by trucks transporting Type Y-1 or Y-2 material. The Bill of Lading shall contain: US DOT description including shipping name, hazard class, and ID number; handling codes; quantity of material; and volume of material. Copies of the bills of lading shall be provided to the Engineer upon placement of Type Y-1 or Y-2 material in its final location. Trucks carrying Type Y-1 or Y-2 material shall not leave the highway right of way.
- M. Spill Contingency Plan for material containing aurally deposited lead.

DUST CONTROL

Excavation, transportation, placement, and handling of material containing aurally deposited lead shall result in no visible dust migration. The Contractor shall have a water truck or tank on

the job site at all times while clearing and grubbing and performing earthwork operations in work areas containing aurally deposited lead.

STOCKPILING

Stockpiles of material containing aurally deposited lead shall not be placed where affected by surface run-on or run-off. Stockpiles shall be covered with plastic sheeting 0.33 mm minimum thickness or 0.3 m of non-hazardous material. Stockpiles shall not be placed in environmentally sensitive areas. Stockpiled material shall not enter storm drains, inlets, or waters of the State.

MATERIAL TRANSPORTATION

Prior to traveling on public roads, loose and extraneous material shall be removed from surfaces outside the cargo areas of the transporting vehicles and the cargo shall be covered with tarpaulins or other cover, as outlined in the approved Excavation and Transportation Plan. The Contractor shall be responsible for costs due to spillage of material containing lead during transport.

The Department will not consider the Contractor a generator of the hazardous material, and the Contractor will not be obligated for further cleanup, removal, or remedial action for such material handled or disposed of in conformance with the requirements specified in these special provisions and the appropriate State and Federal laws and regulations and county and municipal ordinances and regulations regarding hazardous waste.

DISPOSAL

Surplus material for which the lead content is not known shall be analyzed for aurally deposited lead by the Contractor prior to removing the material from within the project limits. The Contractor shall submit a sampling and analysis plan and the name of the analytical laboratory to the Engineer at least 15 days prior to beginning sampling or analysis. The Contractor shall use a laboratory certified by the California Department of Health Services. Sampling shall be at a minimum rate of one sample for each 150 m³ of surplus material and tested for lead using EPA Method 6010 or 7000 series.

Materials containing aurally deposited lead shall be disposed of within California. The disposal site shall be operating under a permit issued by the appropriate California Environmental Protection Agency board or department.

Sampling, analyzing, transporting, and disposing of material containing aurally deposited lead excavated outside the pay limits of excavation will be at the Contractor's expense.

MEASUREMENT AND PAYMENT

Quantities of roadway excavation (aurally deposited lead) , of the types shown in the Engineer's Estimate, will be measured and paid for in the same manner specified for roadway excavation in Section 19, "Earthwork," of the Standard Specifications.

Full compensation for preparing an approved Excavation and Transportation Plan, transporting material containing aurally deposited lead reused in the work from location to location, and transporting and disposing of material containing aurally deposited lead shall be considered as included in the contract prices paid per cubic meter for the items of roadway excavation (aurally deposited lead) of the types involved, and no additional compensation will be allowed therefor.

No payment for stockpiling of material containing aurally deposited lead will be made, unless the stockpiling is ordered by the Engineer.

10-1.41 EROSION CONTROL (BLANKET)

Erosion control (blanket) shall conform to the provisions in Section 20-3, "Erosion Control," of the Standard Specifications and these special provisions.

Erosion control (blanket) work shall consist of applying top soil and seed and installing erosion control blanket to biofiltration swale areas .

MATERIALS

Materials shall conform to the provisions in Section 20-2, "Materials," of the Standard Specifications and these special provisions.

Seed

Seed shall conform to the provisions in Section 20-2.10, "Seed," of the Standard Specifications. Individual seed species shall be measured and mixed in the presence of the Engineer.

Seed not required to be labeled under the California Food and Agricultural Code shall be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts or by a seed technologist certified by the Society of Commercial Seed Technologists.

Seed shall contain not more than 1.0 percent total weed seed by weight.

Seed shall be delivered to the job site in unopened separate containers with the seed tag attached. Containers without a seed tag attached will not be accepted.

For each seed lot greater than 1 kg, a sample of approximately 30 g or 60 ml of seed will be taken from the seed lot by the Engineer.

Seed shall consist of the following:

Seed		
Botanical Name (Common Name)	Percent Germination (Minimum)	Kilograms Pure Live Seed Per Hectare (Slope Measurement)
Agrostis pallens (Siskiyou Thingrass)	35	10
Elymus glaucus (Blue Wildrye)	40	8
Hordeum californicum Prostrate (Prostrate California Barley)	35	6
Poa secunda (Pine Bluegrass)	40	4
Vulpia microstachys (Small Fescue)	40	12

*Seed produced in California only.

Seed Sampling Supplies

At the time of seed sampling, the Contractor shall provide to the Engineer individual glassine lined bag and custody seal tag for sealing each seed sample.

Erosion Control Blanket

Erosion control blanket shall consist of wood excelsior mats secured in place with wire staples and shall conform to the following:

1. Excelsior blanket material shall consist of machine produced mats of curled wood excelsior with 80 percent of the fiber 150 mm or longer. The erosion control blanket shall be of consistent thickness and the wood fiber shall be evenly distributed over the entire area of the blanket. The top surface of the blanket shall be covered with extruded photodegradable plastic netting or lightweight nonsynthetic netting. The blanket shall be smolder resistant without the use of chemical additives and shall be non-toxic and non-injurious to plant and animal life. Erosion control blanket shall be furnished in rolled strips, 1220 mm \pm 25 mm in width, and shall have an average mass of 0.5-kg/m² \pm 10 percent at the time of manufacture.
- 2.. Staples for erosion control blankets shall be made of 11-gage minimum steel wire and shall be U-shaped with 200-mm legs and 50-mm crown.

Imported Topsoil.

Imported topsoil shall conform to the provisions in Section 20-2, "Materials", and Section 20-3, "Erosion Control", of the Standard Specifications

APPLICATION

Erosion control (blanket) materials shall be placed in separate applications as follows:

A. The first application shall consist of applying imported topsoil, to the areas designated on the plans, to a depth of 152-mm. No compaction will be required.

B. The second application shall consist of applying seed at the rates shown in the following table. If hydro-seeding equipment is used to apply seed, the mixture shall be applied within 60 minutes after the seed has been added to the mixture.

Material	Kilograms Per Hectare (Slope Measurement)
Seed	40

C. The third application shall consist of installing the erosion control blanket over the seed application. Erosion control blanket strips shall be placed loosely on the slope with the longitudinal joints perpendicular to the slope contour lines. Longitudinal and transverse joints of blankets shall be butted snugly against adjacent strips or overlapped according to the manufacturer's recommendations and stapled. Staples shall be driven perpendicular to the slopes and shall be located and spaced in conformance with the manufacturer's instructions. Ends of the blankets shall be secured in place in conformance with the manufacturer's instructions.

MEASUREMENT AND PAYMENT

The quantity of erosion control (blanket) will be determined by the square meter from actual slope measurement of the area covered by the erosion control blanket.

The contract price paid per square meter for erosion control (blanket) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing erosion control blanket, complete in place, including furnishing and applying pure live seed, imported topsoil, and the materials for the

erosion control blanket, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.42 MOVE-IN/MOVE-OUT (EROSION CONTROL)

Move-in/move-out (erosion control) shall include moving onto the project when an area is ready to receive erosion control as determined by the Engineer, setting up all required personnel and equipment for the application of erosion control materials and moving out all personnel and equipment when erosion control in that area is completed.

When areas are ready to receive applications of erosion control (Type D), as determined by the Engineer, the Contractor shall begin erosion control work in that area within 5 working days of the Engineer's notification to perform the erosion control work.

Attention is directed to the requirements of erosion control (Type D) elsewhere in these special provisions.

Quantities of move-in/move-out (erosion control) will be determined as units from actual count as determined by the Engineer. For measurement purposes, a move-in followed by a move-out will be considered as one unit.

The contract unit price paid for move-in/move-out (erosion control) shall include full compensation for furnishing all labor, materials (excluding erosion control materials), tools, equipment, and incidentals and for doing all the work involved in moving in and removing from the project all personnel and equipment necessary for application of erosion control (Type D), as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

No adjustment of compensation will be made for any increase or decrease in the quantities of move-in/move-out (erosion control) required, regardless of the reason for the increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications shall not apply to the item of move-in/move-out (erosion control).

10-1.43 EROSION CONTROL (TYPE D)

Erosion control (Type D) includes applying erosion control materials to embankment and excavation slopes and other areas disturbed by construction activities excluding erosion control blanket. Erosion control (Type D) must comply with Section 20-3, "Erosion Control," of the Standard Specifications and these special provisions.

Apply erosion control (Type D) when an area is ready to receive erosion control as determined by the Engineer and under "Move-in/Move-out (Erosion Control)" of these special provisions.

-Before applying erosion control materials, prepare soil surface under Section 19-2.05, "Slopes," of the Standard Specifications, except that rills and gullies exceeding 50 mm in depth or width must be leveled. Remove vegetative growth, temporary erosion control materials, and other debris from areas to receive erosion control.

MATERIALS

Materials must comply with Section 20-2, "Materials," of the Standard Specifications and these special provisions.

Seed

Seed must comply with Section 20-2.10, "Seed," of the Standard Specifications. Seed not required to be labeled under the California Food and Agricultural Code shall be tested for purity and germination by a seed laboratory certified by the Association of Official Seed Analysts or by a seed technologist certified by the Society of Commercial Seed Technologists. Measure and mix individual seed species in the presence of the Engineer.

Seed must contain at most 1.0 percent total weed seed by weight.

Deliver seed to the job site in unopened separate containers with the seed tag attached. Containers without a seed tag attached are not accepted. The Engineer takes a sample of approximately 30 g or 60 ml of seed for each seed lot greater than 1 kg.

Seed must comply with the following:

Seed		
Botanical Name (Common Name)	Percent Germination (Minimum)	Kilograms Pure Live Seed Per Hectare (Slope Measurement)
Lotus scoparius (Deerweed)	30	8.00
Lupinus succulentus (Arroyo Lupine)	40	8.00
Lupinus bicolor Pigmy-Leaved Lupine	40	4.00
Vulpia microstachys Three Week Fescue	40	10.00

*Seed produced in California only.

Seed Sampling Supplies

At the time of seed sampling, provide the Engineer a glassine lined bag and custody seal tag for each seed lot sample.

Commercial Fertilizer

Commercial fertilizer must comply with Section 20-2.02, "Commercial Fertilizer," of the Standard Specifications

Compost

The compost producer must be fully permitted as specified under the California Integrated Waste Management Board, Local Enforcement Agencies and any other State and Local Agencies that regulate Solid Waste Facilities. If exempt from State permitting requirements, the composting facility must certify that it follows guidelines and procedures for production of compost meeting the environmental health standards of Title 14, California Code of Regulations, Division 7, Chapter 3.1, Article 7.

The compost producer must be a participant in United States Composting Council's Seal of Testing Assurance program.

Compost may be derived from any single, or mixture of any of the following feedstock materials:

1. Green material consisting of chipped, shredded, or ground vegetation; or clean processed recycled wood products
2. Biosolids
3. Manure
4. Mixed food waste

Compost feedstock materials to reduce weed seeds, pathogens and deleterious materials as specified under Title 14, California Code of Regulations, Division 7, Chapter 3.1, Article 7, Section 17868.3

Compost must not be derived from mixed municipal solid waste and must be reasonably free of visible contaminants. Compost must not contain paint, petroleum products, pesticides or any other chemical residues harmful to animal life or plant growth. Compost must not possess objectionable odors.

Metal concentrations in compost must not exceed the maximum metal concentrations listed in Title 14, California Code of Regulations, Division 7, Chapter 3.1, Section 17868.2.

Compost must comply with the following:

Physical/Chemical Requirements		
Property	Test Method	Requirement
pH	*TMECC 04.11-A, Elastometric pH 1:5 Slurry Method, pH Units	6.0–8.0
Soluble Salts	TMECC 04.10-A, Electrical Conductivity 1:5 Slurry Method dS/m (mmhos/cm)	0-10.0
Moisture Content	TMECC 03.09-A, Total Solids & Moisture at 70+/- 5 deg C, % Wet Weight Basis	N/A
Organic Matter Content	TMECC 05.07-A, Loss-On-Ignition Organic Matter Method (LOI), % Dry Weight Basis	30–65
Maturity	TMECC 05.05-A, Germination and Vigor Seed Emergence Seedling Vigor % Relative to Positive Control	80 or Above 80 or Above
Stability	TMECC 05.08-B, Carbon Dioxide Evolution Rate mg CO ₂ -C/g OM per day	8 or below
Particle Size	TMECC 02.02-B Sample Sieving for Aggregate Size Classification % Dry Weight Basis	95% Passing 16 mm 70% Passing 9 mm
Pathogen	TMECC 07.01-B, Fecal Coliform Bacteria < 1000 MPN/gram dry wt.	Pass
Pathogen	TMECC 07.01-B, Salmonella < 3 MPN/4 grams dry wt.	Pass
Physical Contaminants	TMECC 02.02-C, Man Made Inert Removal and Classification: Plastic, Glass and Metal, % > 4mm fraction	Combined Total: < 1.0
Physical Contaminants	TMECC 02.02-C, Man Made Inert Removal and Classification: Sharps (Sewing needles, straight pins and hypodermic needles), % > 4mm fraction	None Detected

*TMECC refers to "Test Methods for the Examination of Composting and Compost," published by the United States Department of Agriculture and the United States Compost Council (USCC).

Before compost application, provide the Engineer with a copy of the compost producer's compost technical data sheet and a copy of the compost producers Seal of Testing Assurance certification. The compost technical data sheet includes:

1. Laboratory analytical test results
2. Directions for product use
3. List of product ingredients

Before compost application, provide the Engineer with a Certificate of Compliance under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

Stabilizing Emulsion

Stabilizing emulsion must comply with Section 20-2.11, "Stabilizing Emulsion," of the Standard Specifications and these special provisions.

Stabilizing emulsion:

1. Must be in a dry powder form
2. Must be a processed organic adhesive used as a soil tackifier
3. May be reemulsifiable

APPLICATION

Apply erosion control materials in separate applications in the following sequence:

1. Apply the following mixture with hydroseeding equipment at the rates indicated within 60 minutes after the seed has been added to the mixture:

Material	Kilograms Per Hectare (Slope Measurement)
Seed	30.00
Fiber	800
Commercial Fertilizer	150

Material	Cubic Meter Per Hectare (Slope Measurement)
Compost	125

2. Compost may be dry applied at the total of the rates specified in the preceding table and the following table instead of including it as part of the hydro-seeding operations. In areas where the compost is dry applied, all compost for that area must be applied before the next operation.
3. Apply the following mixture with hydro-seeding equipment at the corresponding rates:

Material	Kilograms Per Hectare (Slope Measurement)
Fiber	800
Stabilizing Emulsion (Solids)	200

Material	Cubic Meter Per Hectare (Slope Measurement)
Compost	125

The ratio of total water to total stabilizing emulsion in the mixture must be as recommended by the manufacturer.

-The Engineer may change the rates of erosion control materials to meet field conditions.

MEASUREMENT AND PAYMENT

Erosion control (Type D) will be measured by the hectare. The area will be calculated on the basis of actual or computed slope measurements.

The contract price paid per hectare for erosion control (Type D) includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in applying erosion control (Type D) complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.44 ROCK BLANKET(TYPE 1)

Rock blanket shall be placed as shown on the plans and in conformance with these special provisions.

MATERIALS

Rock for the rock blanket (Type 1) shall be clean, smooth multi colored cobble type rock naturally colored reddish brown in overall appearance after placement and shall be obtained from a single source.

Rock for the rock blanket (Type 1) shall conform to the following :sizing.

RockSize (Millimeters)	Percentage
330X380	10
150X330	80
130X150	10

Rock shall be secured in place with Class 2 concrete conforming to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions. Concrete aggregate size shall be 9.5-mm maximum. Gaps between the rocks shall be filled with dry applied mortar. Mortar shall be mixed to one part portland cement and two parts sand by volume. Sand shall be of a size that passes a 2.4 mm sieve.

SITE PREPARATION

Areas to receive rock blanket shall be cleared of trash and debris. Weeds shall be removed to the ground level. Cleared trash, debris and removed weeds shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

After clearing, the areas shall be excavated to the depth shown on the plans, graded to a smooth uniform surface and compacted to a minimum relative compaction of 90 percent.

After compaction, the areas including openings at existing sign posts, fence posts and panel markers shall be sterilized with dichlobenil. The sterilant shall be applied at the maximum label rate and shall not be applied more than 300 mm beyond the rock blanket (Type 1) limits. Soil sterilant shall conform to the provisions in Section 20-4.026, "Pesticides," of the Standard Specifications, except recommendations from a licensed Pest Control Adviser will not be required.

PLACEMENT

Rock shall be placed randomly mixing the various sizes of rock while concrete is still plastic. Concrete shall be formed by wood headers and metal stake anchors. The Contractor shall remove concrete adhering to the exposed surfaces of the rock. Loose rocks, shall be reset at the Contractor's expense by methods determined by the Engineer.

to the mortared areas. Excess mortar shall be removed from the face of the rock.

Wood headers will not be required at locations where rock blanket (Type 1) borders the edge of pavement.

Finished rock blanket (Type 1) surfacing shall be uniform and shall maintain existing, or as designated by the engineer, flow lines, slope gradients and contours of the project site.

Test Panel. A test panel at least 2m x 2m in size shall be successfully completed at a location approved by the Engineer before beginning work on placing rock blanket (Type 1). The test panel shall be constructed and finished with the materials, tools, equipment and methods to be used for finished rock blanket (Type 1). If ordered by the engineer, additional test panels shall be constructed until the specified placement, finish, and texture are obtained, as determined by the Engineer.

In the event more than two test panels are required by the Engineer, each additional sample will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

The test panel approved by the Engineer shall be used as the standard of comparison in determining acceptability of placing rock blanket (type 1).

MEASUREMENT AND PAYMENT

Rock blanket (Type 1) will be measured by the square meter as determined from actual measurements made parallel to the ground slope.

The contract price paid per square meter for rock blanket (Type 1) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in placing rock blanket, complete in place, including furnishing and applying soil sterilant, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.45 IRRIGATION CROSSOVERS

Irrigation crossovers shall conform to the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications and these special provisions.

Conduits shall be placed in open trenches in conformance with the provisions in Section 20-5.03B, "Conduit for Irrigation Crossovers," of the Standard Specifications.

Conduits shall be corrugated steel pipe.

Water line crossovers shall conform to the provisions in Section 20-5.03C, "Water Line Crossovers," of the Standard Specifications.

Sprinkler control crossovers shall conform to the provisions in Section 20-5.027D, "Sprinkler Control Crossovers," of the Standard Specifications.

Installation of pull boxes shall conform to the provisions in Section 20-5.027I, "Conductors, Electrical Conduit and Pull Boxes," of the Standard Specifications. When no conductors are

installed in electrical conduits, pull boxes for irrigation crossovers shall be installed on a foundation of compacted soil.

10-1.46 IRRIGATION CROSSEOVERS

Irrigation crossovers shall conform to the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications and these special provisions.

Conduits shall be installed under existing paving by jacking or drilling methods in conformance with the provisions in Section 20-5.03B, "Conduit for Irrigation Crossovers," of the Standard Specifications.

10-1.47 AGGREGATE SUBBASE

Aggregate subbase must comply with Section 25, "Aggregate Subbases," of the Standard Specifications and these special provisions.

Aggregate subbase must be Class 2.

Do not store reclaimed asphalt concrete or aggregate subbase with reclaimed asphalt concrete within 30 m measured horizontally of any culvert, watercourse, or bridge.

10-1.48 AGGREGATE BASE

Aggregate base must comply with Section 26, "Aggregate Bases," of the Standard Specifications and these special provisions.

Aggregate base must be Class 2.

Do not store reclaimed asphalt concrete or aggregate base with reclaimed asphalt concrete within 30 m measured horizontally of any culvert, watercourse, or bridge.

10-1.49 LEAN CONCRETE BASE

Lean concrete base shall conform to the provisions in Section 28, "Lean Concrete Base," of the Standard Specifications and these special provisions.

The finished surface of lean concrete base shall not be above the grade established by the Engineer, or more than 15 mm below the grade established by the Engineer.

10-1.50 HOT MIX ASPHALT

GENERAL

Summary

This work includes producing and placing hot mix asphalt (HMA) Type A using the QC/QA process.

Comply with Section 39, "Hot Mix Asphalt," of the Standard Specifications.

Submittals

Quality Control / Quality Assurance Projects

With the job mix formula (JMF) submittal, submit:

1. California Test 204 plasticity index results
2. California Test 371 tensile strength ratio results for untreated HMA

3. California Test 371 tensile strength ratio results for treated HMA if untreated HMA tensile strength ratio is below 70

At project start-up and once during production, submit samples split from your HMA production sample for California Test 371 to the Engineer and the Transportation Laboratory, Attention: Moisture Test.

With the JMF submittal, at project start-up, and each 5000 tonnes, submit the California Test 371 test results for mix design and production to the Engineer and electronically to:

Moisture_Tests@dot.ca.gov

Data Cores

Three business days before starting coring, submit proposed methods and materials for backfilling data core holes.

Submit to the Engineer and electronically to Coring@dot.ca.gov:

1. A summary of data cores taken
2. A photograph of each data core

For each data core, the summary must include:

1. Project identification number
2. Date cored
3. Core identification number
4. Type of materials recovered
5. Type and approximate thickness of unstabilized material not recovered
6. Total core thickness
7. Thickness of each individual material to within:

7.1 For recovered material, 12.5 mm

7.2 For unstabilized material, 25 mm

8. Location including:

- 8.1. County
- 8.2. Route
- 8.3. Post mile
- 8.4. Lane number
- 8.5. Lane direction
- 8.6. Station

Each data core digital photograph must include a ruler laid next to the data core. Each photograph must include:

1. The core
2. Project identification number
3. Core identification number
4. Date cored

5. County
6. Route
7. Post mile
8. Lane number
9. Lane direction

After data core summary and photograph submittal, dispose of cores under Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Quality Control and Assurance

Quality Control / Quality Assurance Projects

For the mix design, determine the plasticity index of the aggregate blend under California Test 204. Choose an antistrip treatment and use the corresponding laboratory procedure for the mix design in compliance with:

Antistrip Treatment Lab Procedures for Mix Design

Antistrip Treatment	Lab Procedure
Plasticity index from 4 to 10 ^a	
Dry hydrated lime with marination	LP-6
Lime slurry with marination	LP-7
Plasticity index less than 4	
Liquid	LP-5
Dry hydrated lime without marination	LP-6
Dry hydrated lime with marination	LP-6
Lime slurry with marination	LP-7

Notes:

^a If the plasticity index is greater than 10, do not use that aggregate blend.

For the mix design, determine tensile strength ratio under California Test 371 on untreated HMA. If the tensile strength ratio is less than 70:

1. Choose from the antistrip treatments specified based on plasticity index.
2. Test treated HMA under California Test 371.
3. Treat to a minimum tensile strength ratio of 70.

On the first production day and at least every 5000 tonnes, sample HMA and test under California Test 371.

The Department does not use California Test 371 test results for JMF verification and production to determine specification compliance.

MATERIALS

Asphalt Binder

The grade of asphalt binder mixed with aggregate for HMA Type A must be PG 64-28 PM for the ramps, collector-distributor roads, SR-66/5th Street, SR-259, 2nd Street, 3rd Street., 4th Street, 6th Street, 9th Street, Baseline Street, and 16th Street, I Street, and H Street. Asphalt binder grade PG 64-10 should be used for local roads other than arterials, HMA dikes, HMA bond breakers, and HMA in miscellaneous areas.

Aggregate

and above	

The aggregate for HMA Type A must comply with the 19-mm grading. The aggregate for HMA dikes, HMA in miscellaneous areas, and HMA bond breakers must comply with the 9.5-mm grading. The aggregate for HMA Type A on city streets must comply with the 12.5-mm grading.

CONSTRUCTION

Vertical Joints

Before opening the lane to public traffic, pave shoulders and median borders adjacent to a lane being paved.

Place HMA on adjacent traveled way lanes so that at the end of each work shift, the distance between the ends of HMA layers on adjacent lanes is between 1.5 m and 3.0 m. Place additional HMA along the transverse edge at each lane's end and along the exposed longitudinal edges between adjacent lanes. Hand rake and compact the additional HMA to form temporary conforms. You may place Kraft paper or another approved bond breaker under the conform tapers to facilitate the taper removal when paving operations resume.

Place additional HMA along the pavement's edge to conform to road connections and private drives. Hand rake, if necessary, and compact the additional HMA to form a smooth conform taper.

Data Cores

Take data cores that include the completed HMA pavement, underlying base, and subbase material. Protect data cores and surrounding pavement from damage.

Take 100-mm or 150-mm diameter data cores:

1. At the beginning, end, and every 800 m within the paving limits of each route on the project
2. After all paving is complete
3. From the center of the specified lane

On a 2-lane roadway, take data cores from either lane. On a 4-lane roadway, take data cores from each direction in the outermost lane. On a roadway with more than 4 lanes, take data cores from the median lane and the outermost lane in each direction.

Each core must include the stabilized materials encountered. You may choose not to recover unstabilized material but you must identify the material. Unstabilized material includes:

1. Granular material
2. Crumbled or cracked stabilized material
3. Sandy or clayey soil

PAYMENT

The contract lump sum price paid for data cores includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in data

coring, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.51 HOT MIX ASPHALT Type A (Bond Breaker)

GENERAL

Summary

This work includes producing and placing hot mix asphalt (HMA) Type A (Bond Breaker) (HMABB) using the _Standard_____ process.

HMA Type A (Bond Breaker) must comply with the requirements for HMA Type A of Section 39, "Hot Mix Asphalt," of the Standard Specifications.

Quality Control and Assurance.

Do not test HMABB aggregate for tensile strength ratio.

MATERIALS

The grade of asphalt binder mixed with aggregate for HMA Type A (Bond Breaker) must be PG 64-10

The amount of asphalt binder mixed with aggregate for HMA Type A (Bond Breaker) shall be increased by one percent by weight of the dry aggregate over the amount of asphalt binder determined for use in HMA Type A under California Test 367.

Aggregate for HMA Type A (Bond Breaker) must comply with the 9.5-mm grading.

Antistrip Treatment

Treat HMABB aggregate with the same anti-strip treatment used for HMA Type A.

JOB MIX FORMULA AND HMA TYPE A (BOND BREAKER) EVALUATION

Prior to the addition of the additional 1 percent of asphalt binder, HMA will conform to the requirements of Hot Mix Asphalt for Job Mix Formula. The JMF for HMA Type A (Bond Breaker) will not be verified. HMA Type A (Bond Breaker) will be evaluated in the first day of production during the start up evaluation.

QUALITY CONTROL TESTING

Perform sampling and testing at the specified frequency for the following quality characteristics:

Minimum Quality Control

Quality Characteristic	Test Method	Minimum Sampling and Testing Frequency	Requirement
Aggregate gradation ^a	CT 202	1 per 750 tonnes and any remaining part	JMF \pm Tolerance ^b
Sand equivalent (min.) ^c	CT 217		47
Asphalt binder content	CT 379 or 382		JMF \pm 0.45%
HMA moisture content (max.)	CT 370	1 per 2500 tonnes but not less than 1 per paving day	1.0%
Percent of maximum theoretical density ^{d, e}	Quality control plan	2 per business day (min.)	> 98%
Aggregate moisture content at continuous mixing plants and RAP moisture content at continuous mixing plants and batch mixing plants ^f	CT 226 or CT 370	2 per day during production	--
Percent of crushed particles coarse aggregate (% min.) One fractured face Two fractured faces Fine aggregate (% min.) (Passing 4.75 mm sieve and retained on 2.38 mm sieve.) One fractured face	CT 205	As necessary and designated in the QCP. At least once per project	90 75 70
Los Angeles Rattler (% max.) Loss at 500 rev.	CT 211		45

Notes:

^a Determine combined aggregate gradation containing RAP under Laboratory Procedure LP-9.

^b The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."

^c Report the average of 3 tests from a single split sample.

^d Required if the total paved thickness is at least 45-mm.

^e Determine maximum theoretical density (California Test 309) at the frequency specified for Test Maximum Density under California Test 375, Part 5.D.

^f For adjusting the plant controller at the HMA plant.

Apply white pigmented curing compound to the finished surface of the HMA Type A (Bond Breaker) prior to placement of the portland cement concrete pavement. Pigmented curing compound must conform to the requirements of ASTM Designation C 309, Type 2, Class A. Curing compound must be applied in 2 separate applications to the area to be surfaced with portland cement concrete pavement. Apply curing compound at the rate of 3.7 m² per liter.

ENGINEER'S ACCEPTANCE

The Engineer samples for acceptance testing and tests for:

HMA Acceptance

Quality Characteristic	Test Method	Requirement
Aggregate gradation ^a	CT 202	JMF \pm Tolerance ^b
Sand equivalent (min.) ^c	CT 217	47
Asphalt binder content	CT 379 or 382	JMF \pm 0.45%
HMA moisture content (max.)	CT 370	1.0%
Percent of maximum theoretical density ^{d, e}	Quality control plan	> 98%
Percent of crushed particles coarse aggregate (% min.)	CT 205	
One fractured face		90
Two fractured faces		75
Fine aggregate (% min) (Passing 4.75 mm sieve and retained on 2.38 mm sieve.)		
One fractured face		70
Los Angeles Rattler (% max.)	CT 211	
Loss at 500 rev.		45

Notes:

^a The Engineer determines combined aggregate gradation containing RAP under Laboratory Procedure LP-9.

^b The tolerances must comply with the allowable tolerances in Section 39-1.02E, "Aggregate."

^c The Engineer reports the average of 3 tests from a single split sample.

^d Required if the total paved thickness is at least 45-mm.

^e The Engineer determines maximum theoretical density (California Test 309) at the frequency specified for Test Maximum Density under California Test 375, Part 5.D.

HMA Type A (Bond Breaker) will be measured and paid for in the same manner specified for HMA in conformance with the requirements of Section 39-5, "Measurement and Payment," of the Standard Specifications.

Full compensation for the additional one percent of asphalt binder used in HMA Type A (Bond Breaker) and for furnishing and applying white pigmented curing compound to the surface of the HMA Type A (Bond Breaker) shall be considered as included in the contract price paid per ton for HMA Type A (Bond Breaker).

10-1.52 HOT MIX ASPHALT (MISCELLANEOUS AREAS)

GENERAL

Summary

This work includes producing hot mix asphalt (HMA) and placing it on miscellaneous areas. Comply with Section 39, "Hot Mix Asphalt," of the Standard Specifications.

CONSTRUCTION

MEASUREMENT AND PAYMENT

There will be no separate measurement and payment for place hot mix asphalt (miscellaneous area) for overside drains, aprons, and at the ends of drainage structures. It shall be considered included in the prices paid for hot mix asphalt dikes, and the drainage structures adjacent to the hot mix asphalt (miscellaneous area), and no separate compensations shall be allowed therefor.

10-1.53 HOT MIX ASPHALT AGGREGATE LIME TREATMENT - SLURRY METHOD

GENERAL

Summary

This work includes treating hot mix asphalt (HMA) aggregate with lime using the slurry method and placing it in stockpiles to marinate.

Treat aggregate for HMA Type A with lime slurry.

Submittals

Determine the exact lime proportions for fine and coarse virgin aggregate and submit them as part of the proposed job mix formula (JMF) under Section 39, "Hot Mix Asphalt," of the Standard Specifications.

Submit the averaged aggregate quality test results to the Engineer within 24 hours of sampling.

Submit a treatment data log from the slurry proportioning device in the following order:

1. Treatment date
2. Time of day the data is captured
3. Aggregate size being treated
4. Wet aggregate flow rate collected directly from the aggregate weigh belt
5. Moisture content of the aggregate just before treatment, expressed as a percent of the dry aggregate mass
6. Dry aggregate flow rate calculated from the wet aggregate flow rate
7. Lime slurry flow rate measured by the slurry meter
8. Dry lime flow rate calculated from the slurry meter output
9. Approved lime ratio for each aggregate size being treated
10. Actual lime ratio calculated from the aggregate weigh belt and the slurry meter output, expressed as a percent of the dry aggregate mass
11. Calculated difference between the approved lime ratio and the actual lime ratio
12. Dry lime and water proportions at the slurry treatment time

Every day during lime treatment, submit the treatment data log on electronic media in tab delimited format on a removable CD-ROM storage disk. Each continuous treatment data set must be a separate record using a line feed carriage return to present the specified data on one line. The reported data must include data titles at least once per report.

Quality Control and Assurance

Your quality control plan (QCP) must include aggregate quality control sampling and testing during aggregate lime treatment. Perform sampling and testing in compliance with:

Aggregate Quality Control During Lime Treatment

Quality Characteristic	Test Method	Minimum sampling and testing frequency
Sand Equivalent	CT 217	Once per 1 000 tonnes of aggregate treated with lime
Percent of crushed particles	CT 205	As necessary and as designated in the QCP
Los Angeles Rattler	CT 211	
Fine aggregate angularity	AASHTO T 304, Method A	
Flat and elongated particles	ASTM D 4791	

Note:

During lime treatment, sample coarse and fine aggregate from individual stockpiles. Combine aggregate in the JMF proportions. Run tests for aggregate quality in triplicate and report test results as the average of 3 tests.

The Engineer orders proportioning operations stopped for any of the following if you:

1. Do not submit the treatment data log.
2. Do not submit the aggregate quality control data.
3. Submit incomplete, untimely, or incorrectly formatted data.
4. Do not take corrective actions.
5. Take late or unsuccessful corrective actions.
6. Do not stop treatment when proportioning tolerances are exceeded.
7. Use malfunctioning or failed proportioning devices.

If you stop treatment, notify the Engineer of any corrective actions taken and conduct a successful 20-minute test run before resuming treatment.

For the aggregate to be treated, determine the moisture content at least once during each 2 hours of treatment. Calculate moisture content under California Test 226 or California Test 370 and report it as a percent of dry aggregate mass. Use the moisture content calculations as a set point for the proportioning process controller.

MATERIALS

High-calcium hydrated lime and water must comply with Section 24-1.02, "Materials," of the Standard Specifications.

Before aggregate is treated, it must comply with the aggregate quality specifications. Do not test treated aggregate for quality control except for gradation. The Engineer does not test treated aggregate for acceptance except for gradation.

The Engineer determines the combined aggregate gradation during HMA production after you have treated aggregate.

Treated aggregate must not have lime balls or clods.

CONSTRUCTION

General

Notify the Engineer at least 24 hours before the start of aggregate treatment.

Treat aggregate separate from HMA production.

Do not treat reclaimed asphalt pavement.

Add lime to the aggregate as slurry consisting of mixed dry lime and water at a ratio of 1 part lime to between 2 parts and 3 parts water by mass. The slurry must completely coat the aggregate.

Lime treat and marinate coarse and fine aggregates separately.

Immediately before mixing lime slurry with aggregate, water must not visibly separate from aggregate.

Treat aggregate and stockpile for marination only once.

The lime ratio is the kilograms of dry hydrated lime per 100 kg of dry aggregate expressed as a percent. Water content of slurry or untreated aggregate must not affect the lime ratio.

Lime ratio ranges are:

Aggregate Gradation	Lime Ratio
Coarse	0.4 to 1.0
Fine	1.5 to 2.0
Combined	0.8 to 1.5

The lime ratio for fine and coarse aggregate must be within ± 0.2 percent of the lime ratio in the accepted JMF. The lime ratio must be within ± 0.2 percent of the approved lime ratio when you combine the individual aggregate sizes in the JMF proportions.

If 3 consecutive sets of recorded treatment data indicate deviation more than 0.2 percent above or below the lime ratio in the accepted JMF, stop treatment.

If a set of recorded treatment data indicates a deviation of more than 0.4 percent above or below the lime ratio in the accepted JMF, stop treatment and do not use the material represented by that set of data in HMA.

If 20 percent or more of the total daily treatment indicates deviation of more than 0.2 percent above or below the lime ratio in the accepted JMF, stop treatment and do not use the day's total treatment in HMA.

If you stop treatment for noncompliance, you must implement corrective action and successfully treat aggregate for a 20-minute period. Notify the Engineer before beginning the 20-minute treatment period.

Lime Slurry Proportioning

Proportion lime and water with a continuous or batch operation.

The device controlling slurry proportioning must produce a treatment data log. The log consists of a series of data sets captured at 10-minute intervals throughout daily treatment. The data must be a treatment activity register and not a summation. The material represented by the data set is the amount produced 5 minutes before and 5 minutes after the capture time. For the contract's duration, collected data must be stored by the controller.

Proportioning and Mixing Lime Slurry Treated Aggregate

Treat HMA aggregate by proportioning lime slurry and aggregate by mass in a continuous operation.

Marinate treated aggregate in stockpiles from 24 hours to 60 days before using in HMA. Do not use aggregate marinated longer than 60 days.

MEASUREMENT AND PAYMENT

Full compensation for lime slurry treated aggregates shall be considered as included in the contract price paid per tonne for HMA as designated in the Engineer's Estimate and no separate payment will be made therefor.

10-1.54 HOT MIX ASPHALT AGGREGATE LIME TREATMENT - DRY LIME METHOD

GENERAL

Summary

This work includes treating hot mix asphalt (HMA) aggregate with lime using the dry lime method either with marination or without.

Treat aggregate for HMA Type A with dry lime.

Marinate aggregate if the plasticity index determined under California Test 204 is from 4 to 10.

Submittals

Determine the exact lime proportions for fine and coarse virgin aggregate and submit them as part of the proposed job mix formula (JMF) under Section 39, "Hot Mix Asphalt," of the Standard Specifications.

If marination is required, submit in writing the averaged aggregate quality test results to the Engineer within 24 hours of sampling.

Submit in writing a treatment data log from the dry lime and aggregate proportioning device in the following order:

1. Treatment date
2. Time of day the data is captured
3. Aggregate size being treated
4. HMA type and mix aggregate size
5. Wet aggregate flow rate collected directly from the aggregate weigh belt
6. Aggregate moisture content, expressed as a percent of the dry aggregate mass
7. Flow rate of dry aggregate calculated from the flow rate of wet aggregate
8. Dry lime flow rate
9. Lime ratio from the accepted JMF for each aggregate size being treated
10. Lime ratio from the accepted JMF for the combined aggregate
11. Actual lime ratio calculated from the aggregate weigh belt output, the aggregate moisture input, and the dry lime meter output, expressed as a percent of the dry aggregate mass
12. Calculated difference between the approved lime ratio and the actual lime ratio

Every day during lime treatment, submit the treatment data log on electronic media in tab delimited format on a removable CD-ROM storage disk. Each continuous treatment data set must be a separate record using a line feed carriage return to present the specified data on one line. The reported data must include data titles at least once per report.

Quality Control and Assurance

If marination is required, the quality control plan (QCP) specified in Section 39-4, "Quality Control / Quality Assurance," must include aggregate quality control sampling and testing during lime treatment. Perform sampling and testing in compliance with:

Quality Characteristic	Test Method	Minimum sampling and testing frequency
Sand Equivalent	CT 217	Once per 1 000 tonnes of aggregate treated with lime
Percent of crushed particles	CT 205	As necessary and as designated in the QCP
Los Angeles Rattler	CT 211	
Fine aggregate angularity	AASHTO T 304, Method A	
Flat and elongated particles	ASTM D 4791	

Note: During lime treatment, sample coarse and fine aggregate from individual stockpiles. Combine aggregate in the JMF proportions. Run tests for aggregate quality in triplicate and report test results as the average of 3 tests.

The Engineer orders proportioning operations stopped for any of the following if you:

1. Do not submit the treatment data log
2. Do not submit the aggregate quality control data for marinated aggregate
3. Submit incomplete, untimely, or incorrectly formatted data
4. Do not take corrective actions
5. Take late or unsuccessful corrective actions
6. Do not stop treatment when proportioning tolerances are exceeded
7. Use malfunctioning or failed proportioning devices

If you stop treatment, notify the Engineer of any corrective actions taken and conduct a successful 20-minute test run before resuming treatment.

MATERIALS

Lime must be high-calcium hydrated lime. Lime and water must comply with Section 24-1.02, "Materials," of the Standard Specifications.

Before aggregate is treated, it must comply with the aggregate quality specifications. Do not test treated aggregate for quality control except for gradation. The Engineer does not test treated aggregate for acceptance except for gradation.

The Engineer determines the combined aggregate gradation during HMA production after you have treated aggregate.

Treated aggregate must not have lime balls or clods.

CONSTRUCTION

General

Notify the Engineer in writing at least 24 hours before the start of aggregate treatment.

Do not treat reclaimed asphalt pavement.

If marination is required:

1. Treat and marinate coarse and fine aggregates separately.

2. Treat aggregate and stockpile for marination only once.
3. Treat aggregate separate from HMA production.

The lime ratio is the kilograms of dry hydrated lime per 100 kg of dry aggregate expressed as a percent. Water content of untreated aggregate must not affect the lime ratio.

Lime ratio ranges are:

Aggregate Gradation	Lime Ratio
Coarse	0.4 to 1.0
Fine	1.5 to 2.0
Combined	0.8 to 1.5

The lime ratio for fine and coarse aggregate must be within ± 0.2 percent of the lime ratio in the accepted JMF. The lime ratio must be within ± 0.2 percent of the approved lime ratio when you combine the individual aggregate sizes in the JMF proportions.

Proportion dry lime by mass with a continuous operation.

The device controlling dry lime and aggregate proportioning must produce a treatment data log. The log consists of a series of data sets captured at 10-minute intervals throughout daily treatment. The data must be a treatment activity register and not a summation. The material represented by a data set is the amount produced 5 minutes before and 5 minutes after the capture time. For the duration of the contract, collected data must be stored by the controller.

If 3 consecutive sets of recorded treatment data indicate deviation more than 0.2 percent above or below the lime ratio in the accepted JMF, stop treatment of lime treated aggregates.

If a set of recorded treatment data indicates a deviation of more than 0.4 percent above or below the lime ratio in the accepted JMF, stop treatment of lime treated aggregates and do not use the material represented by that set of data in HMA.

If 20 percent or more of the total daily treatment indicates deviation of more than 0.2 percent above or below the lime ratio in the accepted JMF, stop treatment and do not use the day's treated aggregate in HMA.

If you stop treatment for noncompliance, you must implement corrective action and successfully treat aggregate for a 20-minute period. Notify the Engineer before beginning the 20-minute treatment period.

If you use a batch-type proportioning operation for HMA production, control proportioning in compliance with the specifications for continuous mixing plants. Use a separate dry lime aggregate treatment operation from HMA batching operations including:

1. Pugmill mixer
2. Controller
3. Weigh belt for the lime
4. Weigh belt for the aggregate

If using a continuous mixing operation for HMA without lime marinated aggregates, use a controller that measures the blended aggregate mass after any additional water is added to the mixture. The controller must determine the amount of lime added to the aggregate from the aggregate weigh belt input in connection with the manually input total aggregate moisture, the manually input target lime content, and the lime proportioning system output. Use a continuous aggregate weigh belt and pugmill mixer for the lime treatment operation in addition to the weigh belt for the aggregate proportioning to asphalt binder in the HMA plant. If you use a water meter for moisture control for lime treatment, the meter must comply with California Test 109.

At the time of mixing dry lime with aggregate, the aggregate moisture content must ensure complete lime coating. The aggregate moisture content must not cause aggregate to be lost between the point of weighing the combined aggregate continuous stream and the dryer. Add water for mixing and coating aggregate to the aggregate before dry lime addition. Immediately before mixing lime with aggregate, water must not visibly separate from aggregate.

The HMA plant must be equipped with a bag house dust system. Material collected in the dust system must be returned to the mix.

Mixing Dry Lime and Aggregate

Mix aggregate, water, and dry lime with a continuous pugmill mixer with twin shafts. Immediately before mixing lime with aggregate, water must not visibly separate from aggregate. Store dry lime in a uniform and free flowing condition. Introduce dry lime to the pugmill in a continuous operation. The introduction must occur after the aggregate cold feed and before the point of proportioning across a weigh belt and the aggregate dryer. Prevent loss of dry lime.

If marination is required, marinate treated aggregate in stockpiles between 24 hours and 60 days before using in HMA. Do not use aggregate marinated more than 60 days.

The pugmill must be equipped with paddles arranged to provide sufficient mixing action and mixture movement. The pugmill must produce a homogeneous mixture of uniformly coated aggregates at mixer discharge.

If the aggregate treatment operation is stopped longer than 1 hour, clean the equipment of partially treated aggregate and lime.

Aggregate must be completely treated before introduction into the mixing drum.

MEASUREMENT AND PAYMENT

Full compensation for dry lime treating HMA aggregate including marination shall be considered as included in the contract price paid per tonne for HMA as designated in the Engineer's Estimate and no separate payment will be made therefor.

10-1.55 LIQUID ANTISTRIPE TREATMENT

GENERAL

Summary

This work includes treating asphalt binder with liquid antistrip (LAS) treatment to bond the asphalt binder to aggregate in hot mix asphalt (HMA).

Submittals

For LAS, submit with the proposed job mix formula (JMF) submittal under Section 39, "Hot Mix Asphalt," of the Standard Specifications:

1. Materials Safety Data Sheet (MSDS)
2. One 1/2-L sample
3. Infrared analysis including copy of absorption spectra

Submit a certified copy of test results and a MSDS for each LAS lot.

Submit a Certificate of Compliance under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each LAS shipment. With each certificate also submit:

1. Your signature and printed name
2. Shipment number
3. Material type
4. Material specific gravity
5. Refinery
6. Consignee
7. Destination
8. Quantity
9. Contact or purchase order number
10. Shipment Date

Submit proportions for LAS as part of the JMF submittal specified in Section 39-1.03, "Hot Mix Asphalt Mix Design Requirements," of the Standard Specifications. If you change the brand or type of LAS, submit a new JMF.

For each job site delivery of LAS, submit one 1/4-L sample to the Transportation Laboratory. Submit shipping documents to the Engineer. Label each LAS sampling container with:

1. LAS type
2. Application rate
3. Sample date
4. Contract number

At the end of each day's production shift, submit production data in electronic and printed media. Present data on electronic media in tab delimited format. Use line feed carriage return with one separate record per line for each production data set. Allow sufficient fields for the specified data. Include data titles at least once per report. For each mixing operation type, submit in order:

1. Batch Mixing:
 - 1.1. Production date
 - 1.2. Time of batch completion
 - 1.3. Mix size and type
 - 1.4. Each ingredient's mass
 - 1.5. Asphalt binder content as percentage of dry aggregate mass
 - 1.6. LAS content as percentage of asphalt binder mass
2. Continuous Mixing:
 - 2.1. Production date
 - 2.2. Data capture time
 - 2.3. Mix size and type
 - 2.4. Flow rate of wet aggregate collected directly from the aggregate weigh belt
 - 2.5. Aggregate moisture content as percentage of dry aggregate mass
 - 2.6. Flow rate of asphalt binder collected from the asphalt binder meter
 - 2.7. Flow rate of LAS collected from the LAS meter
 - 2.8. Asphalt binder content as percentage of dry aggregate mass calculated from:

- 2.8.1. Aggregate weigh belt output
- 2.8.2. Aggregate moisture input
- 2.8.3. Asphalt binder meter output

2.9. LAS content as percentage of asphalt binder mass calculated from:

- 2.9.1. Asphalt binder meter output
- 2.9.2. LAS meter output

Quality Control and Assurance

For continuous mixing and batch mixing operations, sample asphalt binder before adding LAS. For continuous mixing operations, sample combined asphalt binder and LAS after the static mixer.

The Engineer orders proportioning operations stopped for any of the following if you:

- 1. Do not submit data
- 2. Submit incomplete, untimely, or incorrectly formatted data
- 3. Do not take corrective actions
- 4. Take late or unsuccessful corrective actions
- 5. Do not stop production when proportioning tolerances are exceeded
- 6. Use malfunctioning or failed proportioning devices

If you stop production, notify the Engineer of any corrective actions taken before resuming.

MATERIALS

LAS-treated asphalt binder must comply with Section 39, "Hot Mix Asphalt," of the Standard Specifications. LAS does not substitute for asphalt binder.

LAS total amine value must be 325 minimum when tested under ASTM D 2074.

Use only 1 LAS type or brand at a time. Do not mix LAS types or brands.

Store and mix LAS under the manufacturer's recommendations.

CONSTRUCTION

LAS must be between 0.5 and 1.0 percent by mass of asphalt binder.

If 3 consecutive sets of recorded production data show actual delivered LAS mass is more than ± 1 percent of the approved mix design LAS weight, stop production and take corrective action.

If a set of recorded production data shows actual delivered LAS mass is more than ± 2 percent of the approved mix design LAS weight, stop production. If the LAS mass exceeds 1.2 percent of the asphalt binder mass, do not use the HMA represented by that data.

The continuous mixing plant controller proportioning the HMA must produce a production data log. The log consists of a series of data sets captured at 10-minute intervals throughout daily production. The data must be a production activity register and not a summation. The material represented by the data is the amount produced 5 minutes before and 5 minutes after the capture time. For the duration of the contract, collected data must be stored by the plant controller or a computer's memory at the plant.

MEASUREMENT AND PAYMENT

Full compensation for LAS is included in the contract price paid per tonne for HMA as designated in the Engineer's Estimate and no separate payment will be made therefor

10-1.56 JOINTED PLAIN CONCRETE PAVEMENT

GENERAL

Jointed plain concrete pavement shall be constructed in conformance with the provisions in Section 40, "Portland Cement Concrete Pavement," of the Standard Specifications and these special provisions, and as shown on the plans.

Insert method for forming joints in pavement shall not be used.

PREPAVING CONFERENCE

Supervisory personnel of the Contractor and subcontractors who are to be involved in the concrete paving work shall meet with the Engineer at a prepaving conference, at a mutually agreed time, to discuss methods of accomplishing the paving work.

The Contractor shall provide a facility for the prepaving conference within 5 km of the construction site or at a nearby location agreed to by the Engineer. Attendance at the prepaving conference is mandatory for the Contractor's project superintendent, paving construction foreman, subcontractor's workers, including foremen and personnel performing saw cutting, joint sealing, concrete plant manager, and concrete plant operator. Conference attendees shall sign an attendance sheet provided by the Engineer. Production and placement shall not begin nor proceed unless the above-mentioned personnel have attended the mandatory prepaving conference.

JUST-IN-TIME TRAINING

Attending a 4-hour Just-In-Time Training (JITT) shall be mandatory, and consist of a formal joint training class on portland cement concrete and paving techniques. Construction operations for portland cement concrete paving shall not begin until the Contractor's and the Engineer's personnel have completed the mandatory JITT. The Contractor's personnel included in the list of participants for the prepaving conference as well as the Engineer's representatives shall attend JITT. JITT shall be in addition to the prepaving conference.

The JITT class will be conducted for not less than 4 hours on portland cement concrete pavement and paving techniques. The training class may be an extension of the prepaving conference and shall be conducted at a project field location convenient for both the Contractor and the Engineer. The JITT class shall be completed at least 15 days, not including Saturdays or holidays, prior to the start of portland cement concrete paving operations. The class shall be held during normal working hours.

The JITT instructor shall be experienced in the construction methods, materials, and test methods associated with construction of portland cement concrete pavement and paving techniques. The instructor shall not be an employee of the Contractor or a member of the Engineer's field staff. A copy of the course syllabus, handouts, and presentation material shall be submitted to the Engineer at least 7 days before the day of the training. The Contractor and the Engineer shall mutually agree to course instructor, the course content, and training site. The instructor shall issue a certificate of completion to the participants upon completion of the class. The certificate of completion shall include the course title, date and location of the class, the name of the participant, instructor's name, location and telephone number.

The Contractor's or Engineer's personnel involved with portland cement concrete paving operations will not be required to attend JITT if they have completed equivalent training within the previous 12 months of the date of the JITT for this project. The Contractor shall provide a certificate of class completion as described above for each staff member to be excluded from the JITT class. The Engineer will provide the final determination for exclusion of staff member's participation. Attendees of the JITT shall complete, and submit to the Engineer, an evaluation of the training. The Engineer will provide the course evaluation form.

Just-In-Time Training shall not relieve the Contractor of responsibility under the contract for the successful completion of the work in conformance with the requirements of the plans and specifications.

TEST STRIP

At the beginning of paving operations, the Contractor shall construct a test strip of concrete pavement from 200 m to 300 m in length. The paving width for the test strip shall be the same as that intended by the Contractor for production work. The Contractor shall use the same equipment to construct the test strip for the remainder of the paving operations, except as specified in this section. The Contractor shall not begin paving operations until the test strip has been evaluated in conformance with the provisions in Section 40-1.10, "Final Finishing," of the Standard Specifications regarding surface straight edge requirements, and "Profile Index" in this section; for dowel and tie bar alignment verification; concrete quality (except modulus of rupture); and pavement thickness. Additional test strips will be required when:

1. A portion of a test strip fails to conform to the provisions in Section 40-1.10, "Final Finishing," of the Standard Specifications for straight edge requirements;
2. A portion of the test strip fails to conform to profile requirements;
3. The Contractor proposes different paving equipment, including a batch plant, paver, dowel bar inserter, tie bar inserter, tining, or curing equipment;
4. The dowel bar tolerances are not met;
5. The pavement thickness deficiency is greater than 15 mm after grinding; or
6. A change in concrete mix proportions has occurred.

The Contractor shall perform coring of the test strips as part of the dowel and tie bar placement tolerance verification, and pavement thickness verification. The Engineer will select a minimum of six dowel bars that will be cored for each test strip. The Engineer will have the option of selecting up to 6 tie bars that will be cored for each test strip. After removal of cores, voids in concrete pavement shall be cleaned and filled with hydraulic cement grout conforming to the provisions in "Core Drilling for Dowel Placement Alignment Assurance Testing" in this section.

Before mechanical dowel bar inserters are used, the Contractor shall demonstrate that the insertion equipment will not leave surface irregularities such as depressions, dips, or high areas adjacent to the dowel bar insertion point, or voids or segregation around dowel bars.

Before placement of the test strip, the Contractor shall submit a written procedure to locate transverse weakened plane joints that will coincide with the center of the dowel bars being placed and locating the tie bars along the longitudinal joints. This procedure shall be submitted prior to the prepaving conference, and shall describe the control of inadvertent covering of paint markings after applying curing compound, excessive paint spray producing too large a paint dot marking for the accuracy required, misalignment by transferring marking spots, and inadequate staking of joints.

Construction of concrete pavement shall not proceed until the Engineer has completed an evaluation of the test strip. The Engineer shall be allowed 3 business days to evaluate the test strip. If, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the Engineer not completing the evaluation of the test strip within the time specified, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications. Test strips failing to conform to the specifications for concrete pavement shall be removed. Additional test strips shall be constructed until the Contractor constructs a test strip that conforms to the specifications for concrete pavement. Additional test strips shall conform to the requirements in this section, except the test strip shall be 200 m in length.

Prior to constructing additional test strips, the Contractor shall change methods or equipment to construct a test strip that conforms to the provisions in Section 40-1.10, "Final Finishing," of the Standard Specifications, "Profile Index" of this section, and dowel bar alignment verification, without grinding or other corrective work.

The Engineer may waive the initial test strip if the Contractor proposes to use a batch plant mixer and paving equipment with the same personnel that were satisfactorily used on a Department project within the preceding 12 months. The personnel shall be individuals listed in the prepaving conference used on a preceding Department project.

Materials resulting from the construction and removal of rejected test strips shall become the property of the Contractor and shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

MATERIALS

Concrete

Attention is directed to Section 90, "Portland Cement Concrete," of the Standard Specifications, regarding mix proportions for concrete being determined by the Contractor.

Primary aggregate gradings shall conform to the gradation requirements of Section 90-3, "Aggregate Gradings," of the Standard Specifications. When combined in the proportions determined by the Contractor, the percent passing the 9.5 mm sieve and retained on the 2.36 mm sieve shall not be less than 16 percent of the total aggregate.

The cementitious material content shall not exceed 400 kg/m³.

Tie Bars

Tie bars shall be deformed reinforcing steel bars conforming to the requirements of ASTM Designation: A 615/A 615M, Grade 280 or 420; ASTM Designation: A 615/A 615M (Grade 280 or 420), A996/A996M or A706/A706M. Tie bars shall be epoxy-coated in conformance with the requirements in ASTM Designation: A 934/A 934M or A 775/A 775M and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except the epoxy-coating thickness after curing shall be between 175 micrometers to 400 micrometers (7 mils to 16 mils). Fabrication, sampling and jobsite handling shall conform to the requirements in ASTM Designation: D 3963 and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except the 2 samples shall be 750 mm long. Epoxy-coated tie bars shall not be bent.

Epoxy (Drill and Bond)

Epoxy for bonding tie bars and dowel bars to portland cement concrete shall be a two-component, epoxy-resin, conforming to the requirements of ASTM Designation: C 881, Type V,

Grade 3 (Non-Sagging), Class A, B or C. The class used shall be dependent on the internal temperature of the hardened concrete at the time the epoxy is to be applied. Class A shall be used when the internal temperature is below 4°C, but not lower than recommended by the manufacturer. Class B shall be used when the internal temperature is from 4°C to 15°C. Class C shall be used when the internal temperature is above 15°C, but not higher than recommended by the manufacturer. A Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished with the epoxy. A copy of the manufacturer's recommended installation procedure shall be provided to the Engineer at least 7 days prior to the start of work. Epoxy shall be applied in conformance with the manufacturer's recommendations.

Dowel Bars

Dowel bars shall be plain round smooth, epoxy-coated steel conforming to the requirements in ASTM Designation: A 615/A 615M, Grade 280 or 420, the details shown on the plans and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except that the two samples required in ASTM Designation D 3963/D 3963M shall be 460 mm long. Epoxy coating of dowel bars shall conform to the provisions in ASTM Designation: A 884/A 884M, Class A, Type 1 or Type 2, except that the bend test shall not apply.

Dowel bars shall be free from burrs or other deformations detrimental to free movement of the bars in the concrete.

Bond Breaker

Dowel bars shall be lubricated with a bond breaker over the entire bar. A bond breaker application of petroleum paraffin based lubricant or white-pigmented curing compound shall be used to coat the dowel bars completely prior to placement. Oil and asphalt based bond breakers shall not be used. Paraffin based lubricant shall be Dayton Superior DSC BB-Coat or Valvoline Tectyl 506 or an approved equal. Paraffin based lubricant shall be factory applied. White pigmented curing compound shall conform to the requirements of ASTM Designation: C 309, Type 2, Class A, and shall contain 22 percent minimum nonvolatile vehicles consisting of at least 50 percent paraffin wax. Curing compound shall be applied in 2 separate applications, the last application not more than 8 hours prior to placement of the dowel bars. Each application of curing compound shall be applied at the approximate rate of one liter per 3.7 m².

Dowel Bar Baskets

Dowel bar baskets shall be manufactured with a minimum welded wire gage number of MW 65. Baskets shall be either U-frame or A-frame shape. J-frame shapes shall not be used. Baskets shall be fabricated in conformance with the requirements in ASTM Designation: A 82. Welding of baskets shall conform to the requirements in AASHTO Designation: M 254. A broken weld will be a cause for rejection of the basket. Baskets shall be Class A, Type 1 epoxy-coated in conformance with the requirements in ASTM Designation: A 884/A 884M. Fabrication and job-site handling shall conform to the requirements in ASTM Designation: D 3963 and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except that sampling of epoxy-coated wire reinforcement will not be required. A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished for each shipment of epoxy-coated wire reinforcement certifying that the coated bars conform to the requirements in ASTM Designation: A 884/A 884M and the provisions in Section 52-1.02B, "Epoxy-coated Bar Reinforcement," of the Standard Specifications. The Certificate of Compliance shall include the certifications

specified in ASTM Designation: A 884/A 884M and a statement that the coating material has been pre-qualified by acceptance testing performed by the Valley Forge Laboratories, Inc., Devon, Pennsylvania.

Concrete fasteners shall be used for anchoring dowel bar baskets to lean concrete base, hot mix asphalt used as base, hot mix asphalt bond breaker, asphalt treated permeable base, or cement treated permeable base. Concrete fasteners shall be driven fasteners such as concrete nails, used specifically for fastening to hardened concrete, or hot mix asphalt used as base. Concrete fasteners shall conform to the requirements of ASTM Designation: F 1667. Concrete nails used as fasteners on lean concrete base, hot mix asphalt bond breaker, or hot mix asphalt used as base shall have a minimum shank diameter of 4 mm with a minimum shank length of 64 mm. Concrete nails used as fasteners on asphalt treated or cement treated permeable base shall have a minimum shank diameter of 4 mm with a minimum shank length of 120 mm. Shank length shall be the distance from the point to the bottom of the nail head. Clips and washers shall be commercial quality manufactured for use with dowel bar baskets. The surface of concrete fasteners, clips, and washers shall be either zinc electroplated or galvanized with a minimum coating thickness of 0.005-mm.

Tie Bar Baskets

Tie bar baskets shall be manufactured with a minimum welded wire gage number of MW 65. Baskets shall be either U-frame or A-frame shape. J-frame shapes shall not be used. Tie bar baskets shall be fabricated in conformance with the requirements in ASTM Designation: A 82. Welding of baskets shall conform to the requirements in AASHTO Designation: M 254. A broken weld will be a cause for rejection of the basket. Baskets shall be Class A, Type 1 epoxy-coated in conformance with the requirements in ASTM Designation: A 884/A 884M. Fabrication and job-site handling shall conform to the requirements in ASTM Designation: D 3963 and the provisions in Section 52-1.02B, "Epoxy-coated Reinforcement," of the Standard Specifications, except that sampling of epoxy-coated wire reinforcement will not be required. A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished for each shipment of epoxy-coated wire reinforcement certifying that the coated bars conform to the requirements in ASTM Designation: A 884/A 884M and the provisions in Section 52-1.02B, "Epoxy-coated Bar Reinforcement," of the Standard Specifications. The Certificate of Compliance shall include the certifications specified in ASTM Designation: A 884/A 884M and a statement that the coating material has been pre-qualified by acceptance testing performed by the Valley Forge Laboratories, Inc., Devon, Pennsylvania.

Concrete fasteners shall be used for anchoring tie bar baskets to lean concrete base, hot mix asphalt used as base, hot mix asphalt bond breaker, asphalt treated permeable base, or cement treated permeable base. Concrete fasteners shall be driven fasteners such as concrete nails, used specifically for fastening to hardened concrete, or hot mix asphalt used as base. Concrete fasteners shall conform to the requirements of ASTM Designation: F 1667. Concrete nails used as fasteners on lean concrete base, hot mix asphalt bond breaker, or hot mix asphalt used as base shall have a minimum shank diameter of 4 mm with a minimum shank length of 64 mm. Concrete nails used as fasteners on asphalt treated or cement treated permeable base shall have a minimum shank diameter of 4 mm with a minimum shank length of 120 mm. Shank length shall be the distance from the point to the bottom of the nail head. Clips and washers shall be commercial quality manufactured for use with tie bar baskets. The surface of concrete fasteners, clips, and washers shall be either zinc electroplated or galvanized with a minimum coating thickness of 0.005-mm.

Reinforcement

Reinforcement shall be epoxy coated and shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications.

Silicone Joint Sealant

Silicone joint sealant shall be used for longitudinal isolation joints only.

Low modulus silicone joint sealant shall be furnished in a one-part silicone formulation. Acid cure sealant shall not be used. The compound shall be compatible with the surface to which it is applied and shall conform to the following requirements:

Property	Test Method	Requirement
Tensile stress, 150% elongation, 7-day cure at $25^{\circ} \pm 1^{\circ}\text{C}$ and 45% to 55% R.H. ^e	ASTM D 412 (Die C)	310 kPa max.
Flow at $25^{\circ} \pm 1^{\circ}\text{C}$	ASTM C 639 ^a	Shall not flow from channel
Extrusion Rate at $25^{\circ} \pm 1^{\circ}\text{C}$	ASTM C 603 ^b	75-250 g/min.
Specific Gravity	ASTM D 792 Method A	1.01 to 1.51
Durometer Hardness, at -18°C , Shore A, cured 7 days at $25^{\circ} \pm 1^{\circ}\text{C}$	ASTM C 661	10 to 25
Ozone and Ultraviolet Resistance, after 5000 hours	ASTM C 793	No chalking, cracking or bond loss
Tack free at $25^{\circ} \pm 1^{\circ}\text{C}$ and 45% to 55% R.H. ^e	ASTM C 679	Less than 75 minutes
Elongation, 7 day cure at $25^{\circ} \pm 1^{\circ}\text{C}$ and 45% to 55% R.H. ^e	ASTM D 412 (Die C)	500 percent min.
Set to Touch, at $25^{\circ} \pm 1^{\circ}\text{C}$ and 45% to 55% R.H. ^e	ASTM D 1640	Less than 75 minutes
Shelf Life, from date of shipment	—	6 months min.
Bond, to concrete mortar-concrete briquettes, air cured 7 days at $25^{\circ} \pm 1^{\circ}\text{C}$	AASHTO T 132 ^c	345 kPa min.
Movement Capability and Adhesion, 100% extension at -18°C after, air cured 7 days at $25^{\circ} \pm 1^{\circ}\text{C}$, and followed by 7 days in water at $25^{\circ} \pm 1^{\circ}\text{C}$	ASTM C 719 ^d	No adhesive or cohesive failure after 5 cycles

Notes:

- ASTM Designation: C 639 Modified (15 percent slope channel A).
- ASTM Designation: C 603, through 3-mm opening at 345 kPa.
- Mold briquettes in conformance with AASHTO Designation: T 132, sawed in half and bonded with a 1.5 mm maximum thickness of sealant and tested in conformance with AASHTO Designation: T 132. Briquettes shall be dried to constant mass at $100 \pm 5^{\circ}\text{C}$.
- Movement Capability and Adhesion: Prepare 305 mm x 25 mm x 75 mm concrete blocks in conformance with ASTM Designation: C 719. A sawed face shall be used for bond surface. Seal 50 mm of block leaving 12.5 mm on each end of specimen unsealed. The depth of sealant shall be 9.5 mm and the width 12.5-mm.
- R.H. equals relative humidity.

The silicone joint sealant shall be formulated to cure rapidly enough to prevent flow after application on grades of up to 15 percent.

A Certificate of Compliance for the silicone sealant shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate shall also be accompanied with a certified test report of the results of the required tests performed on the sealant material within the previous 12 months prior to proposed use. The Certificate and accompanying test report shall be provided for each lot of silicone joint sealant prior to use on the project.

Preformed Compression Joint Sealant

Preformed compression seals shall conform to the requirements of ASTM Designation: D 2628. Preformed compression seals shall have 5 or 6 cells. Preformed compression seals for Types A2 and B joints shall have 4 or more cells. Lubricant adhesive used with preformed compression seals shall conform to the requirements of ASTM Designation: D 2835. Compression seals and lubricant adhesive shall be installed in conformance with the manufacturer's recommendations and these special provisions. The manufacturer's recommendations shall be submitted to the Engineer at the prepaving conference.

Each lot of compression seal and lubricant adhesive shall be accompanied by a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, and shall be accompanied with storage instructions and precautionary instructions for use. The Certificate shall also be accompanied with a certified test report of the results of the required tests performed on the preformed compression joint sealant material within the previous 12 months prior to proposed use. The Certificate and accompanying test report shall be provided for each lot of joint seal prior to use on the project. The Contractor shall submit the manufacturer's data sheet with installation instructions and recommended type of preformed compression seal for the joint size and depth as shown on the plans. The manufacturer's selected compression seal shall show evidence that the seal is being compressed at level between 40 percent and 50 percent for the joint width and depth shown on the plans.

Foam Backer Rods

Foam backer rods shall be Type 1, conforming to the requirements of ASTM Designation: D 5249. Foam backer rods shall have a diameter prior to placement at least 25 percent greater than the width of the sawcut and shall be expanded, crosslinked, closed-cell polyethylene foam that is compatible with the joint sealant so that no bond or adverse reaction occurs between the rod and sealant. Hot applied sealant that will melt the foam backer rod shall not be used. The Contractor shall submit a manufacturer's data sheet verifying that the foam backer rod is compatible with the sealant to be used.

Joint Filler Material

Joint filler material shall be Type 1 preformed expansion joint filler for concrete conforming to the requirements of ASTM Designation: D 1752.

A Certificate of Compliance for the joint filler material shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The certificate shall be accompanied with a certified test report of the results of the required tests performed on the joint filler material within the previous 12 months prior to proposed use. The certificate and accompanying test report shall be provided for each lot of joint filler material prior to use on the project.

Hydraulic Cement Grout (non-shrink)

Hydraulic cement grout (non-shrink) shall conform to the requirements in ASTM Designation: C 1107. At the Contractor's option, clean, uniformly rounded aggregate filler may be used to extend the grout. The extension of grout shall not exceed 60 percent of the mass of the grout or the maximum amount of grout extension recommended by the manufacturer,

whichever is less. The moisture content of the aggregate filler shall not exceed 0.5-percent. Grading of the aggregate filler shall conform to the following:

Sieve Size	Percentage Passing
12.5 mm	100
9.5 mm	85-100
4.75 mm	10-30
2.36 mm	0-10
1.10 mm	0-5

PAVEMENT CONCRETE MIX PROPORTIONS

The Contractor shall determine the mix proportions for pavement concrete. The laboratory used to develop the mix proportions shall meet the requirements of ASTM Designation: C 1077, and shall have current AASHTO accreditation for test methods AASHTO Designation: T 97 or ASTM Designation: C 78, and AASHTO Designation: T 126 or ASTM Designation: C 192.

The minimum cementitious materials content or the maximum water to cementitious materials ratio shall be determined in conformance with the requirements in California Test 559. Trial mixtures shall be made no more than 24 months before field qualification. The minimum cementitious materials content or the maximum water to cementitious materials ratio shall be that determined from the trial mixtures curve to produce a minimum modulus of rupture of 3.9 MPa at 28 days age and 4.5 MPa at 42 days age. To account for variances in materials, production of concrete, and modulus of rupture testing, the Contractor shall include as part of the proposed mix proportions an increase to the cementitious material content or a decrease to the water to cementitious materials ratio, determined from trial mixtures, to ensure that portland cement concrete produced during paving operations conforms to the requirements in "Modulus of Rupture," in this section.

At least 15 days prior to field qualification, the Contractor shall submit the proposed pavement concrete mix proportions with laboratory test reports. Laboratory test reports shall include modulus of rupture determined for each trial mixture at ages of 10, 21, 28 and 42 days in conformance with the applicable portions of California Test 559.

Field Qualification

Field qualification of proposed mix proportions will be required prior to placement of pavement concrete. The Contractor shall perform field qualification and submit certified test data to the Engineer. Field qualification data shall be based upon the proposed use of materials, mix proportions, mixing equipment, procedures and size of batch.

Proposed concrete mix proportions will be field qualified when the test results of five beams from a single batch of concrete indicate the average modulus of rupture is at least 3.9 MPa with no single beam lower than 3.8 MPa at an age of the Contractor's choice but not later than 28 days. Beams shall be tested for modulus of rupture at a minimum of 10, 21, and 28 days of age. Test specimens shall be made and tested in conformance with the requirements in California Test 523.

The certified field qualification test data reports shall include the following:

1. Date of mixing,
2. Mixing equipment and procedures used,
3. Volume of batch in cubic meters and the mass or volume,
4. Type and source of ingredients used,
5. Penetration and slump of the concrete,

6. The air content of the concrete, and
7. The age at time of testing and strength of concrete specimens tested.

Field qualification test data reports shall be signed by a certified representative in charge of the laboratory that performed the tests.

If the Contractor changes a source of supply or proportions, the Contractor shall submit a new proposed mix design and furnish samples from the new source, or sources, at least 60 days prior to their intended use. The new mix proportions shall be trial batched and field qualified, unless, the Engineer determines the change is not substantive. No extension of contract time will be allowed for the time required to perform the sampling, testing, preparing and qualifying new mix proportions for new aggregate sources proposed by the Contractor.

MODULUS OF RUPTURE

The Engineer will test portland cement concrete pavement for modulus of rupture in conformance with the requirements in California Test 523. Acceptance will be on a lot basis. Each lot shall not to exceed 750 m³ of concrete pavement. The Engineer will determine sample locations. A minimum of six beam specimens shall be made from each sample. Beam specimens will be tested for modulus of rupture at 10, 21, and 28 days. The modulus of rupture for each lot will be calculated by averaging the results of two beams representing that lot tested at 28 days of age. The difference in modulus of rupture between each individual beam result shall not exceed 0.44-MPa.

The Contractor shall perform sampling and testing of beam specimens to determine if concrete pavement has achieved a modulus of rupture of 2.4 MPa when requesting early use of concrete pavement in conformance with the provisions in Section 90-8.03, "Protecting Concrete Pavement," of the Standard Specifications. Beam specimens shall be made and tested in conformance with the requirements in California Test 523.

INSTALLING TIE BARS

Tie bars shall be installed at longitudinal contact joints and longitudinal weakened plane joints as shown on the plans. Contiguous width of new portland cement concrete pavement tied together with tie bars shall not exceed 15 m. Tie bars shall not be installed at joints between portland cement concrete and hot mix asphalt pavements.

Tie bars shall be installed at longitudinal joints by one of the following methods:

1. Drilling and bonding tie bars with two-component, epoxy-resin that conforms to this section. Drilled holes shall be cleaned in conformance with the epoxy manufacturer's instructions and shall be dry at the time of placing the epoxy and tie bars. Tie bars will be rotated 180° while being inserted into the epoxy filled holes. Immediately after inserting the tie bars into the epoxy, the tie bars shall be supported as necessary to prevent movement during curing and shall remain undisturbed until the epoxy has cured as specified by the manufacturer instructions. Tie bars that are improperly placed or bonded, as determined by the Engineer, will be rejected. If rejected, new holes shall be drilled and new tie bars shall be placed and securely bonded to the concrete. Rejected tie bars shall be cut flush with the joint face. Exposed ends of tie bars shall be epoxy coated. The center of the new holes shall be offset 75 mm horizontally from the center of the rejected hole to maintain the minimum clearance to the dowel bar. Work necessary to correct improperly bonded tie bars shall be performed at the Contractor's expense.

2. Inserting tie bars into the plastic slipformed concrete before finishing the concrete. Inserted tie bars shall have full contact between the bar and the concrete. When tie bars are inserted through the pavement surface, the concrete over the tie bars shall be reworked and refinished so that there is no evidence on the surface of the completed pavement that there has been an insertion performed. Loose tie bars shall be replaced by drilling and bonding as described in A above, at the Contractor's expense.
3. Using threaded dowel splice couplers fabricated from deformed bar reinforcement material, free of external welding or machining. Threaded dowel splice couplers shall be accompanied by a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, and shall be accompanied with installation instructions. Installation of threaded dowel splice couplers shall conform to the requirements of the manufacturer's recommendations.
4. Using tie bar baskets that conform to these special provisions

Tie bars shall be oriented perpendicular to the pavement joint and parallel with the surface of the pavement at mid-slab depth. Tie bar alignment tolerances shall conform to the requirements for dowel bars except embedment length tolerance shall be ± 50 mm.

If tie bar baskets are used, they shall be anchored to the base to hold the tie bars at the specified depth and alignment during concrete placement without displacement. A minimum of 8 alternating, equally spaced, concrete fasteners with clips shall be used to anchor each basket (4 per lower runner wire). Temporary spacer wires shall be cut or removed after the baskets are anchored into position before concrete placement. Concrete pavement shall not be placed if the baskets are not in place at least 60 m in advance of the concrete placement operation. The Engineer may waive this requirement upon written request by the Contractor in areas where access is restricted or other construction limitations are encountered. The Contractor shall demonstrate that the baskets are anchored and shall not shift during concrete placement. The Contractor shall provide longer concrete nails than the minimum lengths for the varying bases beneath the portland cement concrete when baskets demonstrate movement.

Full compensation for providing longer concrete nails shall be considered as included in the contract unit price paid per cubic meter for concrete pavement and no additional compensation will be allowed therefor.

DOWEL PLACEMENT

Dowel bars shall be centered on the joint within a tolerance of ± 50 mm in the longitudinal direction directly over the contact joint or sawcut for the transverse weakened plane joints, as shown on the plans. Prior to placement of dowel bars, the Contractor shall submit to the Engineer a written procedure to identify the transverse weakened plane joint locations relative to the middle of the dowel bars and the procedure for consolidating concrete around the dowel bars.

Dowel bars shall be placed at transverse weakened plane joints within shoulder areas except at drainage inlets.

Dowel bars shall be placed at longitudinal joints as shown on the plans.

Dowel bars shall be placed as shown on the plans by using dowel bar baskets or by mechanical insertion.

When dowel bars are placed by mechanical insertion, the concrete over the dowel bars shall be reworked and refinished so that there is no evidence on the surface of the completed pavement that there has been any insertion performed. When drill and bonding of dowel bars is performed at contact joints, a grout retention ring shall be used. When dowel bar baskets are used, they shall be anchored to the base to hold the dowel bars at the specified depth and alignment during

concrete placement without displacement. A minimum of 8 alternating, equally spaced, concrete fasteners with clips shall be used to anchor each 3.6 m dowel bar basket (4 per lower runner wire). At least 10 concrete fasteners shall be used for basket sections greater than 3.6 m and less than or equal to 4.9 m. Temporary spacer wires connecting dowel bar baskets shall be cut or removed after the dowel bar baskets are anchored into position prior to concrete placement. Paving shall be suspended when dowel bar baskets are not in place at least 60 m in advance of the concrete placement operation. The Engineer may waive this requirement upon written request by the Contractor, in areas, where access is restricted, or other construction limitations are encountered. The Contractor shall demonstrate to the Engineer's satisfaction that dowel bar baskets are adequately anchored and not shift during concrete placement. The Contractor shall provide longer concrete nails than the minimum lengths for the varying bases beneath the portland cement concrete when anchored dowel bar baskets demonstrate movement.

Full compensation for providing longer concrete nails shall be considered as included in the contract unit price paid per cubic meter for concrete pavement and no additional compensation will be allowed therefor.

Dowel bar placement at transverse and longitudinal weakened plane joints	
Horizontal offset	±25 mm
Longitudinal translation	±50 mm
Horizontal skew	9 mm
Vertical skew	9 mm
Vertical depth	(d/3 + 12 mm) from pavement surface to top of dowel bar or -15 mm below planned placement

Note: d = pavement thickness in mm

CORE DRILLING FOR DOWEL BAR AND TIE BAR PLACEMENT ALIGNMENT ASSURANCE TESTING

Coring to confirm dowel bar and tie bar placement, alignment, and concrete consolidation shall be provided by the Contractor throughout the project, at locations determined by the Engineer. Each day's paving shall be cored within 2 days by performing a minimum of 2 and a maximum of 4 tests for dowel bar placement and position for every 1670 m² of doweled pavement or fraction thereof and one test for tie bar placement and position for every 3340 m² of pavement with tie bars. One test shall consist of drilling two cores, one on each end of a dowel bar to expose both ends and allow measurement for proper alignment. The minimum core hole diameter shall be 127 mm. If the cores indicate that dowel bars or tie bars are not within the allowable tolerances or if air voids exist surrounding the dowel bars or tie bars, additional cores will be required to determine the limits and severity of unacceptable work.

The holes shall be cored by methods that will not damage the concrete adjacent to the holes. Immediately after coring, the concrete cores shall be submitted to the Engineer for inspection, and the cores shall be identified by the Contractor with a location description.

After removal of cores, core hole voids in concrete pavement shall be cleaned and filled with hydraulic cement grout (non-shrink). After placement of hydraulic cement grout, the material while still plastic shall be finished and textured to match the adjacent pavement surface. The backfill material shall be the same level as the pavement surface.

Water for core drilling operations shall be from a local domestic water supply, and shall contain not more than 1000 parts per million of chlorides as CL, nor more than 1300 parts per million of sulfates as SO₄, nor shall it contain impurities in a sufficient amount to cause discoloration of the concrete or produce etching of the surface.

Water from core drilling operations shall not be permitted to fall on public traffic, to flow across shoulders or lanes occupied by public traffic, or to flow into gutters or other drainage facilities.

Dowel bar and tie bar alignment shall be within the specified tolerances. If dowel bars or tie bars are found to be installed improperly, the paving operations shall not continue until the Contractor has demonstrated to the Engineer that the problem which caused the improper dowel bar or tie bar positioning has been corrected.

Dowel bars in rejected joints shall be replaced by the Contractor by saw cutting on each side of the rejected joint a minimum of 0.9-m, lifting out concrete to be removed, installing new dowel bars at the new transverse joints, installing dowel bars and preformed sponge rubber expansion joint filler along the longitudinal joints, placing concrete, and installing new joints. Preformed sponge rubber expansion joint filler shall conform to the requirements in ASTM Designation: D 1752. New dowel bar holes shall be drilled, not more than 3 mm greater than the dowel bar diameter, by the use of an automatic dowel-drilling rig for the dowels to be installed at the contact joints. Dowel bars shall be placed, as shown on the plans, for the 2 new transverse contact joints. Original exposed tie bars, located within the slab replacement area, shall be cut flush with the lane or pavement edge and dowel bars shall be installed to replace the tie bars at an offset of 75 mm, horizontally from the tie bar location. Holes for dowel bars to be placed along the longitudinal joint shall be drilled, not more than 3 mm greater than the dowel bar diameter, by the use of an automatic dowel-drilling rig for the dowel bars to be installed at the contact joints.

When requested by the Contractor and approved by the Engineer, dowel bars which are more than ± 50 mm but less than ± 75 mm from being centered directly over the sawcut for the transverse weakened plane joint, may remain in place, and the Contractor shall pay to the State the amount of \$32.30 per square meter for the quantity of concrete pavement panels represented by the cores indicating incorrect dowel bar alignment or improper concrete consolidation around dowels. The quantity of concrete pavement area used to determine the amount of payment to the State will be calculated using the panel dimensions for panels adjacent to and inclusive of the joints with incorrect dowel bar alignment or improper concrete consolidation around dowel bars. The Department will reduce compensation from moneys due, or that may become due to the Contractor under the contract. This reduced compensation shall be in addition to other adjustments for incorrect tie bar alignment or improper concrete consolidation around tie bars as specified in these special provisions and for pavement thickness deficiency in conformance with the provisions in Section 40-1.135, "Pavement Thickness," of the Standard Specifications and in addition to other adjustments for deficient Cleanness Value and coarse aggregate grading; and for deficient Sand Equivalent and fine aggregate grading in conformance with the provisions in Section 90-2.02, "Aggregate," of the Standard Specifications.

Tie bars which are not within the specified tolerance for placement and position, as determined from inspection and measurements of cores, may remain in place when requested by the Contractor and approved by the Engineer. The Contractor shall pay to the State the amount of \$16.15 per square meter for the quantity of concrete pavement panels represented by the cores indicating incorrect tie bar alignment or improper concrete consolidation around tie bars. The quantity of concrete pavement area used to determine the amount of payment to the State will be calculated using the panel dimensions for panels adjacent to and inclusive of the joints with incorrect tie bar alignment or improper concrete consolidation around tie bars. The Department will reduce compensation from moneys due, or that may become due to the Contractor under the contract. This reduced compensation will be in addition to other adjustments for incorrect dowel bar alignment or improper concrete consolidation around dowel bars as specified in these special provisions and for pavement thickness deficiency in conformance with the provisions in

Section 40-1.135, "Pavement Thickness," of the Standard Specifications and in addition to other adjustments for deficient Cleanness Value and coarse aggregate grading; and for deficient Sand Equivalent and fine aggregate grading in conformance with the provisions in Section 90-2.02, "Aggregate," of the Standard Specifications.

PREFORMED COMPRESSION JOINT SEAL INSTALLATION

The compression seal alternative joint detail for transverse and longitudinal joints, as shown on the plans, shall apply only to weakened plane joints. Weakened plane joints shall be constructed by the sawing method. Should grinding or grooving be required over or adjacent to any joint after the compression seal has been placed, the joint materials shall be removed and disposed of, and replaced at the Contractor's expense. Compression seals shall be recessed below the final finished surface as shown on the plans.

Transverse weakened plane joints shall be Type A1 or B as shown on the plans. Longitudinal weakened plane joints shall be Type A2 or B as shown on the plans.

Seven days after the concrete pavement placement and not more than 4 hours before placing preformed compression joint seals, the joint walls shall be cleaned by the dry sand blast method and other means as necessary to remove from the joint objectionable material such as soil, asphalt, curing compound, paint and rust. After cleaning the joint, traces of sand, dust and loose material shall be removed from and near the joint for a distance along the pavement surfaces of at least 50 mm on each side of the joint by the use of a vacuum device. Surface moisture or dampness shall be removed at the joints by means of compressed air or moderate hot compressed air or other means approved by the Engineer. Drying procedures that leave a residue or film on the joint wall shall not be used. Sandblasting equipment shall have a maximum nozzle diameter size of 6 ± 1 mm and a minimum pressure of 0.62-MPa.

Longitudinal seals shall be installed before installing transverse seals. Longitudinal seals shall be continuous except at intersections with transverse seals. Transverse seals shall be installed in one continuous piece throughout each transverse joint. After the longitudinal seal is completed and the transverse seal is ready to be installed, a single cut with a sharp instrument or saw shall be made across the longitudinal seal at the middle of the intersection with the transverse seal. After the initial cut of the longitudinal seal, if the longitudinal joint material does not relax enough to allow proper installation of the transverse seal, the longitudinal joint material shall be trimmed precisely to accommodate the transverse seal and form a tight seal between the 2 joints.

An installation machine specifically designed for the installation of preformed compression joint seals shall be used to install the seal at the specified depth without cutting, nicking, or twisting the seal. The installation machine shall install the seal with no more than 4 percent stretch in the installed seal. Hand installation methods of installing seals will not be permitted.

The percentage of stretch shall be determined by laying a length of the preformed compression joint seal material cut to the exact length of the pavement joint to be sealed. The length shall then be measured. The cut length of preformed compression joint seal material shall then be installed in the joint. Excess amount of seal material remaining at the end of the joint shall be measured as the amount of stretch. The measured amount of stretch shall be divided by the original measured length to determine the percentage of stretch.

The completed seal shall not be twisted or have deformities that prevent the seal from making complete continuous contact with the joint walls. Seals installed that are twisted or deformed, or do not make continuous contact with joint walls or with greater than 4 percent stretch of the joint material will be rejected and removed.

CONSTRUCTING TRANSVERSE CONTACT JOINTS

A transverse contact (construction) joint shall be constructed, including dowel bars, at the end of each day's work or where concrete placement is interrupted for more than 30 minutes, to coincide with the next weakened plane joint location.

If sufficient concrete has not been mixed to form a slab to match the next weakened plane joint, when an interruption occurs, the excess concrete shall be removed and disposed of back to the last preceding joint. The cost of removing and disposing of excess concrete shall be at the Contractor's expense. Excess material shall become the property of the Contractor and shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

A metal or wooden bulkhead (header) shall be used to form the joint. The bulkhead shall be designed to accommodate the installation of dowel bars.

CONSTRUCTING LONGITUDINAL ISOLATION JOINTS

Final alignment of perpendicular transverse weakened plane joints in pavement shall not be made to match the spacing or skew of the weakened plane joints in the existing parallel concrete pavement. Tie bars shall not be placed across longitudinal isolation joints. The edge of the existing pavement shall be saw cut a width 3 mm and to the full depth of the existing concrete pavement to produce a flat vertical face. Prior to placing concrete, joint filler material shall be placed as shown on the plans. The joint filler shall be secured to the face of the existing pavement joint face by a method that will hold the joint filler in place and prevent the new concrete from adhering to the existing concrete, during placement of concrete.

Sealant for longitudinal isolation joints shall be silicone and placed in conformance with the requirements for liquid joint sealant installation as specified above, except references to backer rods shall not apply.

CONSTRUCTING TRANSVERSE JOINT CONNECTIONS AND ANCHORS

Concrete pavement joints at transitions to hot mix asphalt pavement, pavement end anchors and bridge approach slabs shall conform to the details as shown on the plans. Paint binder shall be applied to the concrete surface that hot mix asphalt pavement will contact. Paint binder shall be applied in conformance with the provisions in Section 39, "Hot Mix Asphalt," of the Standard Specifications.

PROFILE INDEX

The pavement surface shall be profiled, by the Contractor not more than 10 days following concrete placement, in the presence of the Engineer, using a California Profilograph or equivalent in conformance with the requirements in California Test 526, except a blanking band of zero (null) shall be used to determine the Profile Index. Two profiles shall be made within each traffic lane, one meter from and parallel with each lane line.

Profiled pavement shall conform to the following Profile Index requirements:

1. Pavement on tangent alignment and pavement on horizontal curves having a centerline radius of curve 600 m or more shall have a Profile Index of 64 mm or less for each 0.1-km.
2. Pavement on horizontal curves having a centerline radius of curve 300 m or more but less than 600 m and pavement within the superelevation transition of those curves shall have a Profile Index of 128 mm or less for each 0.1-km.

Individual high points in excess of 7.5 mm, as determined by measurements of the profilogram in conformance with the requirements in California Test 526, except using a blanking band of zero (null), shall be reduced by grinding in conformance with the requirements in Section 40-1.10, "Final Finishing," of the Standard Specifications until the high points as indicated by reruns of the profilograph do not exceed 7.5 mm.

Pavement grinding shall not be performed before 10 days have elapsed after concrete placement, nor before the concrete has developed a modulus of rupture of at least 3.8 MPa.

CONSTRUCTING WEAKENED PLANE JOINTS (EARLY ENTRY SAW METHOD)

The Contractor may construct weakened plane joints using lighter weight concrete saws (early entry saws) specifically designed for sawing fresh concrete without the use of water. The early entry saws shall be capable of sawing joints within 2 hours of cure time after placement of the concrete pavement without ravelling or tearing, as defined in Section 40-1.08B(1), "Sawing Method," of the Standard Specifications. Joints sawed with early entry saws that develop random cracking shall be removed to the nearest controlled joint and replaced with concrete pavement containing dowel bars and tie bars in conformance with these special provisions and as shown on the plans. The removal and replacement work shall be at the Contractor's expense. Weakened plane joints not sawed within 2 hours of placing concrete pavement shall be sawed by conventional power driven wet-type concrete saws in conformance with the requirements of Section 40-1.08B(1), "Sawing Method," of the Standard Specifications.

Sawed grooves shall be cut to a maximum of 3 mm in width for longitudinal and transverse weakened plane joints made with early entry saws. The minimum depth of cut shall be calculated utilizing the formula in Section 40-1.08B(1), "Sawing Method," of the Standard Specifications except $d = t/4$.

TIE BARS ALONG LONGITUDINAL JOINT FOR SHORT RADIUS CURVES

When paving along short radius curves, the transverse joints shall be maintained in a single continuous straight line across lanes, through the radius point. Tie bars shall maintain minimum clearance from the transverse joint as shown on the plans. If the inside or outside curve of the panel does not allow equal uniform spacing of tie bars at 710 mm between tie bars, then the tie bars shall be equally spaced so that a minimum spacing of 375 mm to a maximum spacing of 710 mm is maintained between tie bars. Additional tie bars shall be considered as included in the contract price paid per cubic meter for concrete pavement and no additional compensation will be allowed therefor.

If dowel bars are specified along longitudinal joint for short radius curves, then dowel bars shall conform to the requirements of this special provision for tie bars spacing and tolerance.

MEASUREMENT AND PAYMENT

Sealing longitudinal and transverse weakened plane joints, and longitudinal isolation joints in portland cement concrete pavement will be measured by the meter. When a test strip conforms to the specifications for concrete pavement and remains a part of the project paving surface, the sealed pavement joints will be measured and paid for as seal pavement joint.

The contract price paid per meter for seal pavement joint shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in sealing pavement joints complete in place, including sawing, cleaning and preparing the joints in the concrete pavement, furnishing and installing compression seal, repairing and

patching spalled or raveled sawed joints, and replacing or repairing rejected joints, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract price paid per meter for seal longitudinal isolation joint shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in sealing longitudinal isolation joints complete in place, including sawing, cleaning and preparing the joints in the concrete pavement, furnishing and installing joint filler material, repairing and patching spalled or raveled sawed joints, and replacing or repairing rejected joints, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Concrete pavement will be measured by the cubic meter in conformance with the provisions in Section 40-1.13, "Measurement," of the Standard Specifications. No deduction will be made for the volume of epoxy-coated dowel bars, epoxy-coated tie bars and, when used, tie bar baskets with fasteners and dowel bar baskets with fasteners, in the concrete pavement. When a test strip conforms to the specifications for concrete pavement and remains a part of the project paving surface, the concrete will be measured and paid for as concrete pavement.

The contract price paid per cubic meter for concrete pavement shall include full compensation for furnishing all labor, materials (including cementitious material in the amount determined by the Contractor), tools, equipment, and incidentals, and for doing all the work involved in constructing the portland cement concrete pavement complete in place, including furnishing and placing epoxy-coated dowel bars, epoxy-coated tie bars and, when used, any tie bar baskets and dowel bar baskets with fasteners, submittal to the Engineer all test data for determination of mix proportions of concrete for concrete pavement and for providing the facility, Contractor personnel and all the work involved in arranging and holding the prepaving conference, for constructing and repairing all joints; for performing all profile checks for Profile Index and furnishing final profilograms to the Engineer; for grooving and grinding required for final finishing; and for removing, and replacing pavement for deficient thickness, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for drilling holes and bonding tie bars with epoxy resin shall be considered as included in the contract price paid per cubic meter for concrete pavement and no additional compensation will be allowed therefor.

Full compensation for coring test strips for evaluation by the Engineer and for backfilling core holes with hydraulic cement grout when the test strip remains in place as part of the concrete pavement; and for constructing, coring and removing and disposing of test strips that are rejected shall be considered as included in the contract price paid per cubic meter for concrete pavement and no additional compensation will be allowed therefor.

Costs for providing JITT will be determined in conformance with the provisions in Section 9-1.03, "Force Account Payment," of the Standard Specifications, except no markups shall be added, and the Contractor will be paid for one half of the JITT cost. Costs for providing JITT shall include training materials, class site, and the JITT instructor including the JITT instructor's travel, lodging, meals and presentation materials. All costs incurred by the Contractor or Engineer for attending JITT shall be borne by the party incurring the costs.

Full compensation for core drilling for dowel bar or tie bar alignment and backfilling with hydraulic cement grout shall be considered as included in the contract price per cubic meter for concrete pavement and no additional compensation will be allowed therefor.

If the initial cores show that dowel bars or tie bars are out of alignment tolerances and the Engineer orders additional dowel bar or tie bar coring, full compensation for drilling the

additional cores shall be considered as included in the contract price per cubic meter for concrete pavement and no additional compensation will be allowed therefor.

If the initial cores show that dowel bars or tie bars are within alignment tolerances and the Engineer orders more dowel bar coring the additional cores will be paid for as extra work in conformance with the provisions in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Full compensation for drilling holes and bonding dowel bars with epoxy resin shall be considered as included in the contract price paid per cubic meter for concrete pavement and no additional compensation will be allowed therefor.

Full compensation for furnishing and placing epoxy coated reinforcement for transition end panel shall be considered as included in the contract price paid per cubic meter for concrete pavement and no additional compensation will be allowed therefor.

Full compensation for furnishing and placing paint binder (tack coat) for transition end panel shall be considered as included in the contract price paid per cubic meter for concrete pavement and no additional compensation will be allowed therefor.

10-1.57 EXIT RAMP TERMINI

Portland cement concrete pavement at exit ramp termini shall be constructed as shown on the plans and as provided in Section 40, "Portland Cement Concrete Pavement," of the Standard Specifications.

10-1.58 REPAIR SPALLED JOINTS

This work shall consist of removing unsound or damaged concrete from spalled areas at transverse or longitudinal joints shown on the plans and filling the area with a fast-setting patching grout in conformance with these special provisions.

MATERIALS

Fast-Setting Grout

Fast-setting grout shall be, at the option of the Contractor, any of the following:

1. Either of the following magnesium phosphate grouts:
 - 1.1 Single component water activated, or
 - 1.2 Dual component with a prepackaged liquid activator
2. Modified high alumina based grout, or
3. Hydraulic cement based grout.

The Contractor may use accelerating admixtures conforming to the requirements in ASTM Designation: C 494/C 494M, Type C and to the provisions in Section 90-4, "Admixtures," of the Standard Specifications, except that the chloride content of the accelerating admixture shall be less than one percent by mass. Fast-setting grout shall conform to the following requirements:

Property	Test Method	Requirements
Compressive Strength		
at 3 hours, MPa	California Test 551	21 min.
at 24 hours, MPa	California Test 551	35 min.
Flexural Strength		
at 24 hours, MPa	California Test 551	3.5 min.
Bond Strength: at 24 hours		
SSD Concrete, MPa	California Test 551	2.1 min.
Dry Concrete, MPa	California Test 551	2.8 min.
Water Absorption, %	California Test 551	10 max.
Abrasion Resistance		
at 24 hours, grams	California Test 550	25 max.
Drying Shrinkage at 4 days, %	ASTM Designation: C 596	0.13 max.
Soluble Chlorides by mass, %	California Test 422	0.05 max.
Water Soluble Sulfates* by mass, %	California Test 417	0.25 max.

* Test to be a cube specimen, fabricated in conformance with the requirements in ASTM Designation: C 109/C 109M, cured at least 14 days and then pulverized to 100% passing the 300 μ m sieve.

Clean, uniformly rounded aggregate filler may be used to extend the prepackaged grout. The moisture content of the aggregate filler shall not exceed 0.5-percent by mass. Grading of the aggregate filler shall conform to the following:

Sieve Size	Percentage Passing
6.5 mm	100
1.18 mm	0-5

The amount of aggregate filler shall conform to the fast-setting grout manufacturer's recommendation, but in no case shall the amount of aggregate filler exceed 50 percent of the volume of the grout mix.

Fast-setting grout shall be formulated for a minimum initial set time of 15 minutes and a minimum final set time of 25 minutes at 21°C. The materials, prior to use, shall be stored in a cool, dry environment.

Mix water used with water activated material shall be free from oil and shall not contain more than 2000 parts per million of chlorides as Cl, nor more than 1500 parts per million of sulfates as SO₄.

Water for curing shall not contain impurities in sufficient amounts to cause discoloration of the concrete surface or produce etching of the surface.

The quantity of water or liquid activator to be blended with the dry component for magnesium phosphate grout shall conform to the limits recommended by the manufacturer.

Addition of retarders, when needed, shall conform to the fast-setting grout manufacturer's recommendations.

Silicone Joint Sealant

Silicone joint sealant shall be low modulus and shall be furnished in a one-part silicone formulation. Acid cure sealants shall not be used. The Contractor shall use the same brand of silicone joint sealant throughout the project. The silicone joint sealant shall conform to the following requirements:

Property	Test Method	Requirement
Tensile stress, 150% elongation, 7-day cure at 25°C ± 1°C and 45% to 55% R.H. ^e	ASTM Designation: D 412 (Die C)	310 kPa max.
Flow at 25°C ± 1°C	ASTM Designation: C 639 ^a	Shall not flow from channel
Extrusion Rate at 25°C ± 1°C	ASTM Designation: C 603 ^b	75-250 g/min
Specific Gravity	ASTM Designation: D 792 Method A	1.01 to 1.51
Durometer Hardness, at -18°C, Shore A, cured 7 days at 25°C ± 1°C	ASTM Designation: C 661	10 to 25
Ozone and Ultraviolet Resistance, After 5000 hours	ASTM Designation: C 793	No chalking, cracking or bond loss
Tack free at 25°C ± 1°C and 45% to 55% R.H. ^e	ASTM Designation: C 679	Less than 75 minutes
Elongation, 7 day cure at 25°C ± 1°C and 45% to 55% R.H. ^e	ASTM Designation: D 412 (Die C)	500 percent min.
Set to Touch, at 25°C ± 1°C and 45% to 55% R.H. ^e	ASTM Designation: D 1640	Less than 75 minutes
Shelf Life, from date of shipment	—	6 months min.
Bond, to concrete mortar-concrete briquets, air cured 7 days at 25° ± 1°C	AASHTO Designation: T 132 ^c	345 kPa min.
Movement Capability and Adhesion, 100% extension at -18°C after, air cured 7 days at 25°C ± 1°C, and followed by 7 days in water at 25°C ± 1°C	ASTM Designation: C 719 ^d	No adhesive or cohesive failure after 5 cycles

Notes:

- ASTM Designation: C 639 Modified (15 percent slope channel A).
- ASTM Designation: C 603, through 3-mm opening at 345 kPa.
- Mold briquets in conformance with AASHTO Designation: T 132, sawed in half and bonded with a 1.5 mm maximum thickness of sealant and tested in conformance with AASHTO Designation: T 132. Briquets shall be dried to constant mass at 100 C ± 5° C.
- Movement Capability and Adhesion: Prepare 305 mm x 25 mm x 75 mm concrete blocks in accordance with ASTM Designation: C 719. A sawed face shall be used for bond surface. Seal 50 mm of block leaving 12.5 mm on each end of specimen unsealed. The depth of sealant shall be 9.5 mm and the width 12.5 mm.
- R.H. equals relative humidity.

Silicone joint sealant shall be formulated to cure after application on grades up to 15 percent.

A Certificate of Compliance for silicone joint sealant shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate shall be accompanied with a certified test report of the results for the required tests performed on the sealant material within the previous 12 months prior to proposed use. The Certificate and accompanying test report shall be provided for each lot of silicone joint sealant prior to use on the project.

Backer Rods

Backer rods shall have a diameter prior to placement at least 25 percent greater than the width of the sealant reservoir and shall be expanded, crosslinked, closed-cell polyethylene foam that is compatible with the joint sealant so that no bond or adverse reaction occurs between the rod and sealant. The Contractor shall submit a manufacturer's data sheet verifying that the backer rod is compatible with the sealant to be used.

Joint Bond Breaker

Joint bond breaker material shall be either corrugated cardboard with a 0.15-mm polyethylene covering or expanded polystyrene material.

Bonding Agent

Bonding agent shall be as recommended by the fast-setting grout manufacturer.

SPALL REPAIR PROCEDURE

Concrete Removal

Outlines of rectangular areas, as marked by the Engineer, shall be cut with a diamond bladed saw to a minimum depth of 50 mm. Unsound and damaged concrete between the saw cut and the joint, and to the depth of the saw cut, shall be removed by methods that will not damage the concrete pavement that is to remain in place. Damage to the concrete pavement beyond the limits to be removed shall be repaired at the Contractor's expense. A pneumatic hammer greater than 7 kg shall not be used for removal of concrete.

Concrete pavement removed to repair spalled joints shall become the property of the Contractor and shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Materials Outside the Highway Right of Way," of the Standard Specifications.

Cleaning

After the repair area has been cleared of unsound concrete, the exposed faces of the concrete shall be thoroughly cleaned. Cleaning shall be by abrasive blasting, either sand blasting or high pressure water blasting. Water blasting equipment for concrete cleaning shall be capable of producing a blast pressure of 20 MPa to 40 MPa.

After abrasive blasting, the exposed concrete area shall be cleaned with moisture-free, oil-free compressed air to remove debris. Air compressors shall deliver air at a minimum of 3.4 m³ per minute and develop 0.63-MPa of nozzle pressure.

Joint Bond Breaker Installation

A joint bond breaker shall be placed along the joint, and extend 25 mm beyond the edges of the patch. Joint bond breaker shall be the same width as the existing joint.

Bonding Agent Application

Bonding agent shall be mixed on site in small quantities and mixed in conformance with the manufacturer's instructions. Bonding agent shall be applied in a thin, even coat by using a stiff bristle brush scrubbing the entire area including the patch walls.

Mixing Fast-Setting Grout

Fast-setting grout shall be mixed in a small mobile drum or paddle mixer in conformance with the manufacturer's instructions and these special provisions.

The components of prepackaged, dual component magnesium phosphate grout with a prepackaged liquid activator shall be as supplied by the manufacturer. Portions of components shall not be used. Water shall not be added to dual component magnesium phosphate grout.

Magnesium phosphate grout shall not be mixed in containers or worked with tools containing zinc, cadmium, aluminum, or copper. Modified high alumina based grout shall not be mixed in containers or worked with tools containing aluminum.

Placement of Fast-Setting Grout

Magnesium phosphate grout shall be placed on a dry surface. The grout shall air cure with no curing medium applied. The repaired area shall be protected from public traffic for at least 2 hours after the grout sets.

High alumina based grout and hydraulic cement based grout may be placed on either a dry or damp surface, in conformance with the manufacturer's instructions. Curing shall be in conformance with the manufacturer's instructions. When curing compound is recommended by the manufacturer, either curing compound (1) or (2) that conforms to Section 90-7.01B, "Curing Compound Method," of the Standard Specifications may be used. The repaired area shall be protected from public traffic for at least 2 hours after the grout sets.

Resealing Joints

Existing joints where sealant was removed shall be cleaned, resealed and recessed below the final surface as shown on the plans in conformance with the joint sealant manufacturer's instructions and these special provisions.

MEASUREMENT AND PAYMENT

Full compensation for repairing spalled joints including all labor, material, and incidentals shall be considered as included in the contract price paid per cubic meter for concrete pavement and no additional compensation will be allowed therefor.

10-1.59 GRIND EXISTING CONCRETE PAVEMENT

This work shall consist of grinding existing portland cement concrete as shown on the plans, as specified in Section 42-2, "Grinding," of the Standard Specifications and these special provisions, and as directed by the Engineer.

Grinding equipment for grinding concrete pavements shall use diamond blades mounted on a self-propelled machine designed for grinding and texturing concrete pavements. Grinding equipment that causes raveling, aggregate fracturing, or spalling, or that damages the transverse or longitudinal joints shall not be used.

Grinding shall be performed in the longitudinal direction of the traveled way and shall be done full lane width so that the grinding begins and ends at lines perpendicular to the pavement centerline.

Grinding concrete pavement shall result in a parallel corduroy texture consisting of grooves 2 mm to 3 mm wide with 183 to 193 grooves per meter width of grinding. Tops of ridges shall be between 1.5 mm and 2.0 mm from the bottom of the blade grooves.

The ground surface at transverse joints or cracks will be tested with a $3.6 \text{ m} \pm 0.06\text{-m}$ long straightedge laid on the pavement parallel with the centerline with its midpoint at the joint or crack. The surface shall not vary by more than 2 mm from the lower edge of the straightedge.

Cross-slope uniformity and positive drainage shall be maintained across the entire traveled way and shoulder. The cross-slope shall be uniform so that when tested with a $3.6 \text{ m} \pm 0.06\text{-m}$ long straightedge placed perpendicular to the centerline, the ground pavement surface shall not vary more than 6 mm from the lower edge of the straightedge.

After grinding has been completed, the pavement surface shall be profiled in conformance with the requirements of Section 40-1.10, "Final Finishing," of the Standard Specifications. Two profiles shall be obtained in each lane approximately one meter from the lane lines. The average profile index shall be determined by averaging the two profiles in each lane. Additional grinding

shall be performed, where necessary, to bring the ground pavement surface within the Profile Index requirements specified in Section 40-1.10, "Final Finishing," of the Standard Specifications.

Full compensation for profiling the ground pavement surface with a California profilograph or equivalent and any necessary additional grinding to bring the finished surface within the specified tolerances and for furnishing final profilograms to the Engineer shall be considered as included in the contract price paid per square meter for grind existing concrete pavement and no additional compensation will be allowed therefor.

10-1.60 DISPOSAL OF PORTLAND CEMENT CONCRETE (PCC) PAVEMENT GROOVING AND GRINDING RESIDUES

Disposal of portland cement concrete (PCC) pavement grooving and grinding residues shall be in conformance with the provisions in Section 42, "Groove and Grind Pavement," of the Standard Specifications and these special provisions.

The Contractor shall include water pollution control measures to address the handling of the grinding pavement residue within the Storm Water Pollution Prevention Plan or Water Pollution Control Program, as specified in "Water Pollution Control," of these special provisions.

Temporary storage of PCC pavement grooving and grinding residues shall not be allowed within the highway right of way. The Contractor may transport liquid PCC pavement grooving and grinding residues to an offsite drying location if the Engineer provides written approval. The offsite drying location shall be identified and protected in conformance with "Water Pollution Control," of these special provisions.

A Materials Information Handout is not available for disposal of PCC pavement grooving or grinding residues. The Contractor shall dispose of PCC pavement grooving and grinding residues in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside of the Right of Way," of the Standard Specifications. The facilities listed below were permitted by Regional Water Quality Control Board (RWQCB) or other agencies that may accept PCC pavement grinding and grooving residues as of July 1, 2004. If the Contractor is planning to use one of these sites, the Contractor shall determine if the facility has a current permit to accept PCC pavement grooving and grinding residues and if the facility can accept the waste at the time of generation.

SITE NAME	LOCATION	TELEPHONE	WASTE TYPES / RESTRICTIONS
Clean Harbors Environmental Services Buttonwillow	2500 West Lokern Road Buttonwillow, CA	(562) 432-5445	Hazardous Solids and Non- Hazardous Liquids and Solids
Clean Harbors Environmental Services San Jose	1021 Berryessa San Jose, CA	(408) 451-5000	Hazardous and Non-Hazardous Liquids
Crosby & Overton, Inc.	1610 W. 17th Street Long Beach, CA	(562) 432-5445	Hazardous and Non-Hazardous Liquids
D/K Environmental	3650 East 26th Street Vernon, CA	(323) 268-5056	Hazardous and Non-Hazardous Liquids and Solids
DeMenno-Kerdoon	200 N. Alameda Street Compton, CA	(323) 268-5057 (310) 537-7100	Hazardous and Non-Hazardous Liquids and Solids
Filter Recycling Services, Inc.	180 West Monte Avenue Rialto, CA	(909) 424-1630	Hazardous and Non-Hazardous Liquids
K-Pure Water Works	8910 Rochester Ave Rancho Cucamonga, CA	(909) 476-2308	Non-Hazardous Liquids
Liquid Waste Management McKittrick	56533 Highway 58 McKittrick, CA	(559) 386 - 6104	Non-Hazardous Liquids and Solids
Onyx Environmental Services LLC	1704 W. First Street Azusa, CA	(626) 334-5117	Hazardous and Non-Hazardous Liquids and Solids
Phibro-Tech, Inc.	8851 Dice Road Santa Fe Springs, CA	(562) 698-8036	Hazardous and Non-Hazardous Liquids and Solids
Romic Environmental Technologies Corporation	2081 Bay Road East Palo Alto, CA	(650) 324-1638	Hazardous and Non-Hazardous Liquids
Seaport Environmental	700 Seaport Boulevard Redwood City, CA	(650) 364-8154	Non-Hazardous Liquids
Southwest Treatment Systems, Inc.	4120 Bandini Boulevard Los Angeles, CA	(800) 900-3366	Non-Hazardous Liquids
US Filter Recovery Services, Inc.	5375 S. Boyle Avenue Vernon, CA	(323) 277-1495	Hazardous and Non-Hazardous Liquids and Solids
Waste Management Kettleman City	35251 Old Skyline Road Kettleman City, CA	(559) 386 - 6104	Hazardous and Non-Hazardous Liquids and Solids

If the Contractor disposes of PCC pavement grooving and grinding residues at locations not listed above, the disposal shall be in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, and the following:

1. If the disposal facility is located within the State of California, the facility must be permitted by the RWQCB or other applicable agency, or the Contractor must obtain written approval from the RWQCB or other applicable agency.
2. If located outside of the State of California, the facility must be permitted by the applicable local, state, or federal agencies, or the Contractor must obtain written approval from the applicable local, state, or federal agencies.

The following shall be delivered to the Engineer at least 5 days before disposal of PCC pavement grooving and grinding residues:

1. The name, address, and telephone number of the disposal facility.
2. If the facility is not listed above:
 - A. Copy of the facility's RWQCB or other applicable agency permit, or
 - B. RWQCB's or other applicable agency's approval, or
 - C. Copy of the applicable agency permit if the final disposal location is located outside of the State of California.

The Contractor shall deliver landfill receipts and weight ticket of disposal of residues from PCC pavement grooving and grinding to the Engineer within 5 days of completing of PCC pavement grooving and grinding activities.

The Contractor shall make all arrangements and agreements for the disposal at the time of bidding. Costs related to obtaining approval for disposal within the State of California from the RWQCB or other applicable agency, or the applicable agency if the disposal location is located outside of the State of California, shall be borne by the Contractor and no additional payment shall be made therefore. Full compensation for all costs involved in disposing of PCC pavement grooving or grinding residues as specified in this section, including all costs of handling, temporary storage, hauling and disposal fees, shall be considered as included in the price paid for the contract item of work involving PCC pavement grooving or grinding residues and no additional compensation will be allowed therefore.

10-1.61 PILING

GENERAL

Piling shall conform to the provisions in Section 49, "Piling," of the Standard Specifications, and these special provisions.

Unless otherwise specified, welding of any work performed in conformance with the provisions in Section 49, "Piling," of the Standard Specifications, shall be in conformance with the requirements in AWS D1.1.

Attention is directed to "Project Information," "Precast Concrete Quality Control," and "Welding" of these special provisions.

Difficult pile installation is anticipated due to the presence of overlying dense soils, caving soils, high ground water, cobbles and boulders, underground utilities, hard driving, sound control and traffic control.

Based on soil borings, hard driving may be encountered below the elevations listed:

Bridge Name or Number	Elevations
RIALTO AVENUE UC (WIDEN)	306 m
REDLANDS LOOP OVERHEAD (WIDEN)	307 m
REDLANDS LOOP OVERHEAD - N215 TO 2ND ST OFF-RAMP	307 m
RIALTO AVENUE UC - N215 TO 2ND ST OFF-RAMP	306 m
RIALTO AVENUE UC - S215 TO 2ND ST ON-RAMP	306 m
SECOND ST UC (REPLACE)	309 m
THIRD ST UC (REPLACE)	308 m
N215 TO 5TH ST OFF-RAMP	314 m
5TH ST TO S215 ON-RAMP	317 m
S215 TO 5TH ST OFF-RAMP	317m

Driving System Submittal

Prior to installing driven piling, the Contractor shall provide a driving system submittal, including driveability analysis, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. A submittal shall be made for each control location shown below. All proposed driving systems (i.e., each hammer that may be brought onto the site) shall be included in the submittal. The selected pile-driving hammer shall be able to deliver sufficient energy to drive piles at a penetration rate of not less than 3mm per blow at the required bearing value.

Bridge Number	Control Location
Redlands Loop Overhead (Widen) Br. # 54-0489	Abut 1 and Abut 4
Redlands Loop Overhead – N215 to 2 ND St Off-Ramp Br. # 54-1254S	Abut 1 and Pier 2
Rialto Avenue UC (Widen) Br. # 54-0488	Abut 1 & 2
Rialto Avenue UC S 215 to 2 ND St On-Ramp Br. No. 54-1256K	Abut 1 & 2
Rialto Avenue UC S 215 to 2 ND St Off-Ramp Br. # 54-1255S	Abut 1 & 2
Second Street UC Br. # 54-1259	Abut 1 & 2
Third Street UC Br.# 54-1260	Abut 1 & 2
Third Street UC [Temp Bridge]	Abut 1 & 2
N215/N259 Connector Br. # 54-1240G	Abut 1 & 4

The driving system submittal shall contain an analysis showing that the proposed driving systems will install piling to the specified tip elevation and specified bearing. Driving systems shall generate sufficient energy to drive the piles with stresses not more than 95 percent of the specified yield strength of the steel pile or unfilled steel shell. Submittals shall include the following:

- A. Complete description of soil parameters used, including soil quake and damping coefficients, skin friction distribution, ratio of shaft resistance to nominal compression

- resistance, assumptions made regarding the formation of soil plugs, and assumptions made regarding drilling through the center of open ended steel shells.
- B. List of all hammer operation parameters assumed in the analysis, including fuel settings, stroke limitations, and hammer efficiency.
 - C. Driveability studies that are based on a wave equation analysis using a computer program that has been approved by the Engineer. Driveability studies shall model the Contractor's proposed driving systems, including the hammers, capblocks, and pile cushions, as well as determine driving resistance and pile stresses for assumed site conditions. Separate analyses shall be completed at elevations above the specified tip elevations where difficult driving is anticipated. Studies shall include plots for a range of pile compression capacities above and below the nominal compression resistance shown on the plans. Plots shall include the following:
 - 1. Pile compressive stress versus blows per 0.30-m.
 - 2. Pile tensile stress versus blows per 0.30-m.
 - 3. Nominal compression resistance versus blows per 0.30-m.

When the driveability analysis hammers indicate that open ended pipe pile and steel shell penetration rates are less than 0.30-m per 200 blows and the driving stresses will exceed 80 percent of the specified yield strength of the pipe and steel shell, the study shall include assumptions for drilling through the center of open ended pipe piles and steel shells.

- D. Copies of all test results from any previous pile load tests, dynamic monitoring, and all driving records used in the analyses.
- E. Completed "Pile and Driving Data Form," which is shown in these special provisions.

The driving system submittal shall be stamped and signed by an engineer who is registered as a Civil Engineer in the State of California. Prior to installing piling, the Contractor shall allow the Engineer 15 working days to review a driving system submittal after a complete set, as determined by the Engineer, has been received. Should the Engineer fail to complete his review within the time allowance, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in the driving system submittal review, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays" of the Standard Specifications.

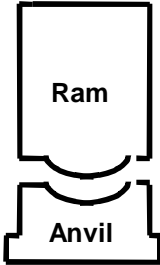

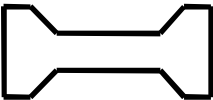

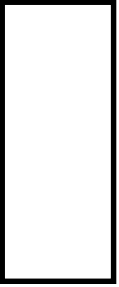
The Contractor shall use the driving system and installation methods described in the approved driving system submittal for a given control location. Any change in hammers from those submitted and approved by the Engineer shall also meet the requirements for driving system submittals. Revised and new driving system submittals shall be approved by the Engineer prior to using corresponding driving systems on production piling. The Contractor shall allow the Engineer 15 working days to review each revised and each new driving system submittal after a complete set, as determined by the Engineer, has been received.

Approval of pile driving equipment will not relieve the Contractor of his responsibility to drive piling, free of damage, to the specified penetration.

CALIFORNIA DEPARTMENT OF TRANSPORTATION
TRANSPORTATION LABORATORY

PILE AND DRIVING DATA FORM

Structure Name : _____ Contract No.: _____
 _____ Project: _____
 Structure No.: _____ Pile Driving Contractor or
 Dist./Co./Rte./kilo.post: _____ Subcontractor _____ (Pile Driven By)

	Hammer	Manufacturer: _____ Model: _____ Type: _____ Serial No.: _____ Rated Energy: _____ at _____ Length of Stroke Modifications: _____ _____ _____ _____
	Capblock (Hammer Cushion)	Material: _____ Thickness: _____ mm Area: _____ mm ² Modulus of Elasticity - E: _____ MPa Coefficient of Restitution - e: _____
	Pile Cap	<div style="display: flex; align-items: center;"> <div style="border: 1px solid black; padding: 2px; margin-right: 10px;"> Helmet Bonnet Anvil Block Drivehead </div> <div> Mass: _____ k </div> </div>
	Pile	Material: _____ Thickness: _____ mm Area: _____ mm ² Modulus of Elasticity - E: _____ MPa Coefficient of Restitution - e: _____
	Pile	Pile Type: _____ Length (In Leads): _____ m kg/m.: _____ Taper: _____ Wall Thickness: _____ mm Cross Sectional Area: _____ mm ² Design Pile Capacity: _____ kN Description of Splice: _____ _____ Tip Treatment Description: _____

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Foundation Testing
- ☐ Translab,
Geotechnical Design
- ☐ Resident Engineer

Note: If mandrel is used to drive the pile, attach separate manufacturer's detail sheet(s) including mass (kg) and dimensions.

Submitted By: _____ Date: _____

Jetting and Drilling

Jetting or drilling to obtain the specified penetration in conformance with the provisions in Section 49-1.05, "Driving Equipment," of the Standard Specifications shall not be used for driven type piles.

,In addition to conforming to the provisions in Section 49-1.05, "Driving Equipment," of the Standard Specifications, should obstructions to driving be encountered, the Contractor shall provide special driving tips or heavier pile sections, or shall subexcavate below the bottom of footing, or take other measures to prevent damage to the pile during driving. Full compensation for providing special tips, heavier sections, or for subexcavating or employing other measures to prevent damage to the piles shall be considered as included in the contract price paid per unit for drive steel pile of the size shown on the plans, and no additional compensation will be allowed therefor.

CAST-IN-DRILLED-HOLE CONCRETE PILES

Cast-in-drilled-hole concrete piling shall conform to the provisions in Section 49-4, "Cast-In-Place Concrete Piles," of the Standard Specifications and these special provisions.

The provisions of "Welding" of these special provisions shall not apply to temporary steel casings.

Cast-in-drilled-hole concrete piles 600 mm in diameter or larger may be constructed by excavation and depositing concrete under slurry.

Materials

Concrete deposited under slurry shall have a nominal penetration equal to or greater than 90 mm. Concrete shall be proportioned to prevent excessive bleed water and segregation.

Concrete deposited under slurry shall contain not less than 400 kg of cementitious material per cubic meter.

The combined aggregate grading used in concrete for cast-in-drilled-hole concrete piling shall be either the 25-mm maximum grading, the 12.5-mm maximum grading, or the 9.5-mm maximum grading and shall conform to the requirements in Section 90-3 "Aggregate Gradings," of the Standard Specifications.

Portions of cast-in-drilled-hole concrete piles shown on the plans to be formed shall be formed and finished in conformance with the provisions for concrete structures in Section 51, "Concrete Structures," of the Standard Specifications.

Mineral Slurry

Mineral slurry shall be mixed and thoroughly hydrated in slurry tanks, and slurry shall be sampled from the slurry tanks and tested before placement in the drilled hole.

Slurry shall be recirculated or continuously agitated in the drilled hole to maintain the specified properties.

Recirculation shall include removal of drill cuttings from the slurry before discharging the slurry back into the drilled hole. When recirculation is used, the slurry shall be sampled and tested at least every 2 hours after beginning its use until tests show that the samples taken from the slurry tank and from near the bottom of the hole have consistent specified properties.

Subsequently, slurry shall be sampled at least twice per shift as long as the specified properties remain consistent.

Slurry that is not recirculated in the drilled hole shall be sampled and tested at least every 2 hours after beginning its use. The slurry shall be sampled mid-height and near the bottom of the hole. Slurry shall be recirculated when tests show that the samples taken from mid-height and near the bottom of the hole do not have consistent specified properties.

Slurry shall also be sampled and tested prior to final cleaning of the bottom of the hole and again just prior to placing concrete. Samples shall be taken from mid-height and near the bottom of the hole. Cleaning of the bottom of the hole and placement of the concrete shall not start until tests show that the samples taken from mid-height and near the bottom of the hole have consistent specified properties.

Mineral slurry shall be tested for conformance to the requirements shown in the following table:

MINERAL SLURRY		
PROPERTY	REQUIREMENT	TEST
Density (kg/m^3) - before placement in the drilled hole - during drilling - prior to final cleaning - immediately prior to placing concrete	1030* to 1110* 1030* to 1200*	Mud Weight (Density) API 13B-1 Section 1
Viscosity (seconds/liter) bentonite attapulgate	29 to 53 29 to 42	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	8 to 10.5	Glass Electrode pH Meter or pH Paper
Sand Content (percent) - prior to final cleaning - immediately prior to placing concrete	less than or equal to 4.0	Sand API 13B-1 Section 5
*When approved by the Engineer, slurry may be used in salt water, and the allowable densities may be increased up to 32 kg/m^3 . Slurry temperature shall be at least 4°C when tested.		

Any caked slurry on the sides or bottom of hole shall be removed before placing reinforcement. If concrete is not placed immediately after placing reinforcement, the reinforcement shall be removed and cleaned of slurry, the sides of the drilled hole cleaned of caked slurry, and the reinforcement again placed in the hole for concrete placement.

Synthetic Slurry

Synthetic slurries shall be used in conformance with the manufacturer's recommendations and these special provisions. The following synthetic slurries may be used:

PRODUCT	MANUFACTURER
SlurryPro CDP	KB Technologies Ltd. 3648 FM 1960 West Suite 107 Houston, TX 77068 (800) 525-5237
Super Mud	PDS Company c/o Champion Equipment Company 8140 East Rosecrans Ave. Paramount, CA 90723 (562) 634-8180
Shore Pac GCV	CETCO Drilling Products Group 1350 West Shure Drive Arlington Heights, IL 60004 (847) 392-5800
Novagel Polymer	Geo-Tech Drilling Fluids 220 N. Zapata Hwy, Suite 11A Laredo, TX 78043 (210) 587-4758

Inclusion of a synthetic slurry on the above list may be obtained by meeting the Department's requirements for synthetic slurries. The requirements can be obtained from the Office of Structure Design, P.O. Box 942874, Sacramento, CA 94274-0001.

Synthetic slurries listed may not be appropriate for a given site.

Synthetic slurries shall not be used in holes drilled in primarily soft or very soft cohesive soils as determined by the Engineer.

A manufacturer's representative, as approved by the Engineer, shall provide technical assistance for the use of their product, shall be at the site prior to introduction of the synthetic slurry into a drilled hole, and shall remain at the site until released by the Engineer.

Synthetic slurries shall be sampled and tested at both mid-height and near the bottom of the drilled hole. Samples shall be taken and tested during drilling as necessary to verify the control of the properties of the slurry. Samples shall be taken and tested when drilling is complete, but prior to final cleaning of the bottom of the hole. When samples are in conformance with the requirements shown in the following tables for each slurry product, the bottom of the hole shall be cleaned and any loose or settled material removed. Samples shall be obtained and tested after final cleaning and immediately prior to placing concrete.

SlurryPro CDP synthetic slurries shall be tested for conformance to the requirements shown in the following table:

SLURRYPRO CDP KB Technologies Ltd.		
PROPERTY	REQUIREMENT	TEST
Density (kg/m ³) - during drilling - prior to final cleaning - just prior to placing concrete	less than or equal to 1075* less than or equal to 1025*	Mud Weight (Density) API 13B-1 Section 1
Viscosity (seconds/liter) - during drilling -prior to final cleaning - just prior to placing concrete	53 to 127 less than or equal to 74	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	6 to 11.5	Glass Electrode pH Meter or pH Paper
Sand Content (percent) - prior to final cleaning - just prior to placing concrete	less than or equal to 0.5	Sand API 13B-1 Section 5
*When approved by the Engineer, slurry may be used in salt water, and the allowable densities may be increased up to 32 kg/m ³ . Slurry temperature shall be at least 4°C when tested.		

Super Mud synthetic slurries shall be tested for conformance to the requirements shown in the following table:

SUPER MUD PDS Company		
PROPERTY	REQUIREMENT	TEST
Density (kg/m ³) - prior to final cleaning - just prior to placing concrete	less than or equal to 1025*	Mud Weight (Density) API 13B-1 Section 1
Viscosity (seconds/liter) - during drilling - prior to final cleaning - just prior to placing concrete	34 to 64 less than or equal to 64	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	8 to 10.0	Glass Electrode pH Meter or pH Paper
Sand Content (percent) - prior to final cleaning - just prior to placing concrete	less than or equal to 0.5	Sand API 13B-1 Section 5
*When approved by the Engineer, slurry may be used in salt water, and the allowable densities may be increased up to 32 kg/m ³ . Slurry temperature shall be at least 4°C when tested.		

Shore Pac GCV synthetic slurries shall be tested for conformance to the requirements shown in the following table:

Shore Pac GCV CETCO Drilling Products Group		
PROPERTY	REQUIREMENT	TEST
Density (kg/m ³) - prior to final cleaning - just prior to placing concrete	less than or equal to 1025*	Mud Weight (Density) API 13B-1 Section 1
Viscosity (seconds/liter) - during drilling - prior to final cleaning - just prior to placing concrete	35 to 78 less than or equal to 60	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	8.0 to 11.0	Glass Electrode pH Meter or pH Paper
Sand Content (percent) - prior to final cleaning - just prior to placing concrete	less than or equal to 0.5	Sand API 13B-1 Section 5
*When approved by the Engineer, slurry may be used in salt water, and the allowable densities may be increased up to 32 kg/m ³ . Slurry temperature shall be at least 4°C when tested.		

Novagel Polymer synthetic slurries shall be tested for conformance to the requirements shown in the following table:

NOVAGEL POLYMER Geo-Tech Drilling Fluids		
PROPERTY	REQUIREMENT	TEST
Density (kg/m ³) - during drilling - prior to final cleaning - just prior to placing concrete	less than or equal to 1075* less than or equal to 1025*	Mud Weight (Density) API 13B-1 Section 1
Viscosity (seconds/liter) - during drilling - prior to final cleaning - just prior to placing concrete	48 to 110 less than or equal to 110	Marsh Funnel and Cup API 13B-1 Section 2.2
pH	6.0 to 11.5	Glass Electrode pH Meter or pH Paper
Sand Content (percent) - prior to final cleaning - just prior to placing concrete	less than or equal to 0.5	Sand API 13B-1 Section 5
*When approved by the Engineer, slurry may be used in salt water, and the allowable densities may be increased up to 32 kg/m ³ . Slurry temperature shall be at least 4°C when tested.		

Water Slurry

At the option of the Contractor, water may be used as slurry when casing is used for the entire length of the drilled hole.

Water slurry shall be tested for conformance to the requirements shown in the following table:

WATER SLURRY		
PROPERTY	REQUIREMENT	TEST
Density (kg/m ³) - prior to final cleaning - just prior to placing concrete	1017 *	Mud Weight (Density) API 13B-1 Section 1
Sand Content (percent) - prior to final cleaning - just prior to placing concrete	less than or equal to 0.5	Sand API 13B-1 Section 5
*When approved by the Engineer, salt water slurry may be used, and the allowable densities may be increased up to 32 kg/m ³ .		

Construction

The Contractor shall submit a placing plan to the Engineer for approval prior to producing the test batch for cast-in-drilled-hole concrete piling and at least 10 working days prior to constructing piling. The plan shall include complete descriptions, details, and supporting calculations as listed below:

A. Requirements for all cast-in-drilled hole concrete piling:

1. Concrete mix design, certified test data, and trial batch reports.
2. Drilling or coring methods and equipment.
3. Proposed method for casing installation and removal when necessary.
4. Plan view drawing of pile showing reinforcement and inspection pipes, if required.
5. Methods for placing, positioning, and supporting bar reinforcement.
6. Methods and equipment for accurately determining the depth of concrete and actual and theoretical volume placed, including effects on volume of concrete when any casings are withdrawn.
7. Methods and equipment for verifying that the bottom of the drilled hole is clean prior to placing concrete.
8. Methods and equipment for preventing upward movement of reinforcement, including the Contractor's means of detecting and measuring upward movement during concrete placement operations.

B. Additional requirements when concrete is placed under slurry:

1. Concrete batching, delivery, and placing systems, including time schedules and capacities therefor. Time schedules shall include the time required for each concrete placing operation at each pile.
2. Concrete placing rate calculations. When requested by the Engineer, calculations shall be based on the initial pump pressures or static head on the concrete and losses throughout the placing system, including anticipated head of slurry and concrete to be displaced.
3. Suppliers' test reports on the physical and chemical properties of the slurry and any proposed slurry chemical additives, including Material Safety Data Sheet.
4. Slurry testing equipment and procedures.
5. Methods of removal and disposal of excavation, slurry, and contaminated concrete, including removal rates.
6. Methods and equipment for slurry agitating, recirculating, and cleaning.

In addition to compressive strength requirements, the consistency of the concrete to be deposited under slurry shall be verified before use by producing a test batch. The test batch shall be produced and delivered to the project under conditions and in time periods similar to those expected during the placement of concrete in the piles. Concrete for the test batch shall be placed in an excavated hole or suitable container of adequate size to allow for testing as specified herein. Depositing of test batch concrete under slurry will not be required. In addition to meeting the specified nominal penetration, the test batch shall meet the following requirements:

- A. For piles where the time required for each concrete placing operation, as submitted in the placing plan, will be 2 hours or less, the test batch shall demonstrate that the proposed concrete mix design achieves either a penetration of at least 50 mm or a slump of at least 125 mm after twice that time has elapsed.
- B. For piles where the time required for each concrete placing operation, as submitted in the placing plan, will be more than 2 hours, the test batch shall demonstrate that the proposed concrete mix design achieves either a penetration of at least 50 mm or a slump of at least 125 mm after that time plus 2 hours has elapsed.

The time period shall begin at the start of placement. The concrete shall not be vibrated or agitated during the test period. Penetration tests shall be performed in conformance with the requirements in California Test 533. Slump tests shall be performed in conformance with the requirements in ASTM Designation: C 143. Upon completion of testing, the concrete shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

The concrete deposited under slurry shall be carefully placed in a compact, monolithic mass and by a method that will prevent washing of the concrete. Concrete deposited under slurry need not be vibrated. Placing concrete shall be a continuous operation lasting not more than the time required for each concrete placing operation at each pile, as submitted in the placing plan, unless otherwise approved in writing by the Engineer. The concrete shall be placed with concrete pumps and delivery tube system of adequate number and size to complete the placing of concrete in the time specified. The delivery tube system shall consist of one of the following:

- A. A tremie tube or tubes, each of which are at least 250 mm in diameter, fed by one or more concrete pumps.
- B. One or more concrete pump tubes, each fed by a single concrete pump.

The delivery tube system shall consist of watertight tubes with sufficient rigidity to keep the ends always in the mass of concrete placed. If only one delivery tube is utilized to place the concrete, the tube shall be placed near the center of the drilled hole. Multiple tubes shall be uniformly spaced in the hole. Internal bracing for the steel reinforcing cage shall accommodate the delivery tube system. Tremies shall not be used for piles without space for a 250-mm tube.

Spillage of concrete into the slurry during concrete placing operations shall not be allowed. Delivery tubes shall be capped with a watertight cap, or plugged above the slurry level with a good quality, tight fitting, moving plug that will expel the slurry from the tube as the tube is charged with concrete. The cap or plug shall be designed to be released as the tube is charged. The pump discharge or tremie tube shall extend to the bottom of the hole before charging the tube with concrete. After charging the delivery tube system with concrete, the flow of concrete through a tube shall be induced by slightly raising the discharge end. During concrete placement, the tip of the delivery tube shall be maintained as follows to prevent reentry of the slurry into the tube. Until at least 3 m of concrete has been placed, the tip of the delivery tube shall be within 150 mm of the bottom of the drilled hole, and then the embedment of the tip shall be maintained at least 3 m below the top surface of the concrete. Rapid raising or lowering of the delivery tube shall not be permitted. If the seal is lost or the delivery tube becomes plugged and must be removed, the tube shall be withdrawn, the tube cleaned, the tip of the tube capped to prevent entrance of the slurry, and the operation restarted by pushing the capped tube 3 m into the concrete and then reinitiating the flow of concrete.

When slurry is used, a fully operational standby concrete pump, adequate to complete the work in the time specified, shall be provided at the site during concrete placement. The slurry level shall be maintained within 300 mm of the top of the drilled hole.

A log of concrete placement for each drilled hole shall be maintained by the Contractor when concrete is deposited under slurry. The log shall show the pile location, tip elevation, dates of excavation and concrete placement, total quantity of concrete deposited, length and tip elevation of any casing, and details of any hole stabilization method and materials used. The log shall include a 215 mm x 280 mm sized graph of the concrete placed versus depth of hole filled. The graph shall be plotted continuously throughout placing of concrete. The depth of drilled hole filled shall be plotted vertically with the pile tip oriented at the bottom and the quantity of concrete shall be plotted horizontally. Readings shall be made at least at each 1.5 m of pile depth, and the time of the reading shall be indicated. The graph shall be labeled with the pile location, tip elevation, cutoff elevation, and the dates of excavation and concrete placement. The log shall be delivered to the Engineer within one working day of completion of placing concrete in the pile.

After placing reinforcement and prior to placing concrete in the drilled hole, if drill cuttings settle out of the slurry, the bottom of the drilled hole shall be cleaned. The Contractor shall verify that the bottom of the drilled hole is clean.

If temporary casing is used, concrete placed under slurry shall be maintained at a level at least 1.5 m above the bottom of the casing. The withdrawal of casings shall not cause contamination of the concrete with slurry.

Material resulting from using slurry shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

Acceptance Testing and Mitigation

Vertical inspection pipes for acceptance testing shall be provided in all cast-in-drilled-hole concrete piles that are 600 mm in diameter or larger, except when the holes are dry or when the holes are dewatered without the use of temporary casing to control ground water.

Inspection pipes shall be Schedule 40 polyvinyl chloride pipes with a nominal inside diameter of 50 mm. Each inspection pipe shall be capped top and bottom and shall have watertight couplers to provide a clean, dry and unobstructed 50-mm diameter clear opening from 1.0 m above the pile cutoff down to the bottom of the reinforcing cage.

If the Contractor drills the hole below the specified tip elevation, the reinforcement and the inspection pipes shall be extended to 75 mm clear of the bottom of the drilled hole.

Inspection pipes shall be placed around the pile, inside the outermost spiral or hoop reinforcement, and 75 mm clear of the vertical reinforcement, at a uniform spacing not exceeding 840 mm measured along the circle passing through the centers of inspection pipes. A minimum of 2 inspection pipes per pile shall be used. When the vertical reinforcement is not bundled and each bar is not more than 26 mm in diameter, inspection pipes may be placed 50 mm clear of the vertical reinforcement. The inspection pipes shall be placed to provide the maximum diameter circle that passes through the centers of the inspection pipes while maintaining the clear spacing required herein. The pipes shall be installed in straight alignment, parallel to the main reinforcement, and securely fastened in place to prevent misalignment during installation of the reinforcement and placing of concrete in the hole.

The Contractor shall log the location of the inspection pipe couplers with respect to the plane of pile cut off, and these logs shall be delivered to the Engineer upon completion of the placement of concrete in the drilled hole.

After placing concrete and before requesting acceptance tests, each inspection pipe shall be tested by the Contractor in the presence of the Engineer by passing a 48.3-mm diameter rigid cylinder 610 mm long through the complete length of pipe. If the 48.3-mm diameter rigid cylinder fails to pass any of the inspection pipes, the Contractor shall attempt to pass a 32.0-mm diameter rigid cylinder 1.375 m long through the complete length of those pipes in the presence of the Engineer. If an inspection pipe fails to pass the 32.0-mm diameter cylinder, the Contractor shall immediately fill all inspection pipes in the pile with water.

The Contractor shall replace each inspection pipe that does not pass the 32.0-mm diameter cylinder with a 50.8-mm diameter hole cored through the concrete for the entire length of the pile. Cored holes shall be located as close as possible to the inspection pipes they are replacing and shall be no more than 150 mm inside the reinforcement. Coring shall not damage the pile reinforcement. Cored holes shall be made with a double wall core barrel system utilizing a split tube type inner barrel. Coring with a solid type inner barrel will not be allowed. Coring methods and equipment shall provide intact cores for the entire length of the pile concrete. The coring operation shall be logged by an Engineering Geologist or Civil Engineer licensed in the State of California and experienced in core logging. Coring logs shall include complete descriptions of inclusions and voids encountered during coring, and shall be delivered to the Engineer upon completion. Concrete cores shall be preserved, identified with the exact location the core was recovered from within the pile, and made available for inspection by the Engineer.

Acceptance tests of the concrete will be made by the Engineer, without cost to the Contractor. Acceptance tests will evaluate the homogeneity of the placed concrete. Tests will include gamma-gamma logging. Tests may also include crosshole sonic logging and other means of inspection selected by the Engineer. The Contractor shall not conduct operations within 8.0 m of the gamma-gamma logging operations. The Contractor shall separate reinforcing steel as necessary to allow the Engineer access to the inspection pipes to perform

gamma-gamma logging or other acceptance testing. After requesting acceptance tests and providing access to the piling, the Contractor shall allow 3 weeks for the Engineer to conduct these tests and make determination of acceptance if the 48.3-mm diameter cylinder passed all inspection pipes, and 4 weeks if only the 32.0-mm diameter cylinder passed all inspection pipes. Should the Engineer fail to complete these tests within the time allowance, and if in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in inspection, the delay will be considered a right of way delay as specified in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

All inspection pipes and cored holes in a pile shall be dewatered and filled with grout after notification by the Engineer that the pile is acceptable. Placement and removal of water in the inspection pipes shall be at the Contractor's expense. Grout shall conform to the provisions in Section 50-1.09, "Bonding and Grouting," of the Standard Specifications. The inspection pipes and holes shall be filled using grout tubes that extend to the bottom of the pipe or hole or into the grout already placed.

If acceptance testing performed by the Engineer determines that a pile does not meet the requirements of the specifications, then that pile will be rejected and all depositing of concrete under slurry or concrete placed using temporary casing for the purpose of controlling groundwater shall be suspended until written changes to the methods of pile construction are approved in writing by the Engineer.

The Contractor shall submit to the Engineer for approval a mitigation plan for repair, supplementation, or replacement for each rejected cast-in-drilled-hole concrete pile, and this plan shall conform to the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. Prior to submitting this mitigation plan, the Engineer will hold a repair feasibility meeting with the Contractor to discuss the feasibility of repairing rejected piling. The Engineer will consider the size of the defect, the location of the defect, and the design information and corrosion protection considerations for the pile. This information will be made available to the Contractor, if appropriate, for the development of the mitigation plan. If the Engineer determines that it is not feasible to repair the rejected pile, the Contractor shall not include repair as a means of mitigation and shall proceed with the submittal of a mitigation plan for replacement or supplementation of the rejected pile.

If the Engineer determines that a rejected pile does not require mitigation due to structural, geotechnical, or corrosion concerns, the Contractor may elect to 1) repair the pile per the approved mitigation plan, or 2) not repair anomalies found during acceptance testing of that pile. For such unrepaired piles, the Contractor shall pay to the State, \$400 per cubic meter for the portion of the pile affected by the anomalies. The volume, in cubic meters, of the portion of the pile affected by the anomalies, shall be calculated as the area of the cross-section of the pile affected by each anomaly, in square meters, as determined by the Engineer, multiplied by the distance, in meters, from the top of each anomaly to the specified tip of the pile. If the volume calculated for one anomaly overlaps the volume calculated for additional anomalies within the pile, the calculated volume for the overlap shall only be counted once. In no case shall the amount of the payment to the State for any such pile be less than \$400. The Department may deduct the amount from any moneys due, or that may become due the Contractor under the contract.

Pile mitigation plans shall include the following:

- A. The designation and location of the pile addressed by the mitigation plan.
- B. A review of the structural, geotechnical, and corrosion design requirements of the rejected pile.

- C. A step by step description of the mitigation work to be performed, including drawings if necessary.
- D. An assessment of how the proposed mitigation work will address the structural, geotechnical, and corrosion design requirements of the rejected pile.
- E. Methods for preservation or restoration of existing earthen materials.
- F. A list of affected facilities, if any, with methods and equipment for protection of these facilities during mitigation.
- G. The State assigned contract number, bridge number, full name of the structure as shown on the contract plans, District-County-Route-Kilometer Post, and the Contractor's (and Subcontractor's if applicable) name on each sheet.
- H. A list of materials, with quantity estimates, and personnel, with qualifications, to be used to perform the mitigation work.
- I. The seal and signature of an engineer who is licensed as a Civil Engineer by the State of California.

For rejected piles to be repaired, the Contractor shall submit a pile mitigation plan that contains the following additional information:

- A. An assessment of the nature and size of the anomalies in the rejected pile.
- B. Provisions for access for additional pile testing if required by the Engineer.

For rejected piles to be replaced or supplemented, the Contractor shall submit a pile mitigation plan that contains the following additional information:

- A. The proposed location and size of additional piling.
- B. Structural details and calculations for any modification to the structure to accommodate the replacement or supplemental piling.

All provisions for cast-in-drilled-hole concrete piling shall apply to replacement piling.

The Contractor shall allow the Engineer 3 weeks to review the mitigation plan after a complete submittal has been received.

Should the Engineer fail to review the complete pile mitigation submittal within the time specified, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the pile mitigation plan, an extension of time commensurate with the delay in completion of the work thus caused will be granted in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

When repairs are performed, the Contractor shall submit a mitigation report to the Engineer within 10 days of completion of the repair. This report shall state exactly what repair work was performed and quantify the success of the repairs relative to the submitted mitigation plan. The mitigation report shall be stamped and signed by an engineer that is licensed as a Civil Engineer by the State of California. The mitigation report shall show the State assigned contract number, bridge number, full name of the structure as shown on the contract plans, District-County-Route-Kilometer Post, and the Contractor (and Subcontractor if applicable) name on each sheet. The Engineer will be the sole judge as to whether a mitigation proposal is acceptable, the mitigation efforts are successful, and to whether additional repairs, removal and replacement, or construction of a supplemental foundation is required.

STEEL PIPE PILING

General

Steel pipe piling shall consist of unfilled steel pipe piling, open ended steel shells for steel pipe piling filled with reinforced concrete. Steel pipe piling shall conform to the provisions in Section 49-5, "Steel Piles," of the Standard Specifications and these special provisions.

Open ended steel pipe shells for steel pipe piling partially filled with reinforced concrete shall conform to the provisions in Section 49-4, "Cast-in-Place Concrete Piles," of the Standard Specifications, these special provisions, and the following:

- A. The piles shall be installed open ended and no internal plates shall be used.
- B. The Contractor shall submit to the Engineer for approval, a cleanout method for concrete filled piling. Care shall be taken during cleaning out of steel shells to prevent disturbing the foundation material surrounding the pile. The portion of the pile not shown filled with concrete shall not be cleaned out. Equipment or methods used for cleaning out steel shells shall not cause quick soil conditions or cause scouring or caving around or below the piles. Steel shells shall be free of any soil, rock, or other material deleterious to the bond between concrete and steel prior to placing reinforcement and concrete.
- C. Material resulting from cleaning out the steel shells shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications, unless otherwise specified or permitted by the Engineer.
- D. Reinforcement shall be placed and secured symmetrically about the axis of the pile and shall be securely blocked to clear the sides of the steel shell.
- E. If conditions render it impossible or inadvisable in the opinion of the Engineer to dewater the shell piling prior to placing reinforcement and concrete, the bottom of the shell shall be sealed in conformance with the provisions in Section 51-1.10, "Concrete Deposited Under Water," of the Standard Specifications. The sealed shell shall then be dewatered and cleaned out as specified herein.
- F. Shear rings at the top open ended steel shells as shown on the plans shall conform to the provisions in Section 55-2, "Materials," of the Standard Specifications and these special provisions. Galvanizing is not required for shear rings.

Wherever reference is made to the American Petroleum Institute (API) specification 5L in the Standard Specifications, on the project plans, or in these special provisions, the year of adoption shall be 2000. All requirements of that code shall apply unless specified otherwise in the Standard Specifications, on the plans, or in these special provisions.

Only longitudinal and spiral seam welds in steel pipe piles may be made by the electric resistance welding method. Those welds shall be welded in conformance with the requirements in API 5L and any amendments to API 5L in the Standard Specifications or these special provisions.

Steel Pipe piling shall either conform to the requirements in API 5L or AWS D1.1, and the provisions specified in Section 49-5, "Steel Piles," of the Standard Specifications and these special provisions.

Handling devices may be attached to steel pipe piling. Welds attaching these devices shall be aligned parallel to the axis of the pile and shall conform to the requirements for field welding specified herein. Permanent bolted connections shall be corrosion resistant. Prior to making attachments, the Contractor shall submit a plan to the Engineer that includes the locations, handling and fitting device details, and connection details. Attachments shall not be made to the steel pipe piling until the plan is approved in writing by the Engineer. The Contractor shall allow

the Engineer 7 days for the review of the plan. In the event the Engineer fails to complete the review within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, and an extension of time will be granted, in the same manner as provided for in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

For steel pipe piling, including bar reinforcement in the piling, the Contractor shall allow the Engineer 48 hours to review the Welding Report, specified in "Welding Quality Control" of these special provisions, and respond in writing after the required items have been received. No field welded steel pipe piling shall be installed, and no reinforcement in the piling shall be encased in concrete until the Engineer has approved the above requirements in writing. In the event the Engineer fails to complete the review and provide within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by reason of the Engineer's delay in completing the review, the Contractor will be compensated for any resulting loss, and an extension of time will be granted, in the same manner as provided for in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

Steel Pipe in Conformance with API 5L

Steel pipe piling conforming to the requirements in API 5L shall conform to the following additional requirements:

- A. Each length of steel pipe piling shall be marked with the API monogram.
- B. The product shall be capable of meeting the fit-up requirements of AWS D1.1, Section 5.22.3.1, "Girth Weld Alignment (Tubular)," when the project requires the material to be spliced utilizing a girth weld.
- C. Welds made at a permanent facility shall be made by submerged arc welding or an electric resistance welding process.
- D. Except for tack welding, the gas metal arc welding process (GMAW) shall not be used for welding of pipe pile material. When GMAW is used for tacking, the electrode shall not be deposited by short circuiting transfer.
- E. The joining of pipe sections in a permanent facility utilizing a circumferential or jointer weld shall conform to the requirements in AWS D1.1.

Steel Pipe in Conformance with AWS D1.1

Steel pipe piling conforming to the requirements in AWS D1.1 shall conform to the following additional requirements:

- A. Weld filler metal shall conform to the requirements in AWS D1.5 for the welding of ASTM Designation: A709/A709M, Grade 345 steel, except that the qualification, pretest, and verification test requirements need not be conducted if certified test reports are provided for the consumables to be used.
- B. Except for tack welding, GMAW shall not be used for welding of pipe pile material. When GMAW is used for tacking, the electrode shall not be deposited by short circuiting transfer.
- C. Pipe piling designated as ASTM Designation A252, which has a yield strength of less than or equal to 450 MPa, shall be treated as ASTM Designation A572/A572M, Grade 345 material for the purpose of welding and pre-qualification of base metal, in conformance with the requirements in AWS D1.1.

- D. Each length of steel pipe piling shall be marked in conformance with the requirements in ASTM Designation: A252.
- E. The outside circumference of the steel pipe piling end shall not vary by more than 10 mm from that corresponding to the diameter shown on the plans.

Field Welding

Field welding of steel piling is defined as welding performed after the certificate of compliance has been furnished by the manufacturer or fabricator and shall conform to the following requirements:

- A. Match marking of pipe ends at the manufacturing or fabrication facility is recommended for piling to ensure weld joint fit-up. Prior to positioning any 2 sections of steel pipe to be spliced by field welding, including those that have been match marked at the manufacturing or fabrication facility, the Contractor shall equalize the offsets of the pipe ends to be joined and match mark the pipe ends.
- B. Welds made in the flat position or vertical position (where the longitudinal pipe axis is horizontal) shall be single-vee or double-vee groove welds. Welds made in the horizontal position (where the longitudinal pipe axis is vertical) shall be single-bevel groove welds. Joint fit-ups shall conform to the requirements in AWS D1.1, Section 5.22.3.1, "Girth Weld Alignment (Tubular)," and these special provisions.
- C. The minimum thickness of the backing ring shall be 6 mm, and the ring shall be continuous. Splices in the backing ring shall be made by complete penetration welds. These welds shall be completed, including visual inspection and any required nondestructive testing (NDT), prior to final insertion into a pipe end. The attachment of backing rings to pipe ends shall be done using the minimum size and spacing of tack welds that will securely hold the backing ring in place. Tack welding shall be done in the root area of the weld splice. Cracked tack welds shall be removed and replaced prior to subsequent weld passes. The gap between the backing ring and the steel pipe piling wall shall be no greater than 2 mm. One localized portion of the backing ring fit-up, that is equal to or less than a length that is 20 percent of the outside circumference of the pipe, as determined by the Engineer, may be offset by a gap equal to or less than 6 mm provided that this localized portion is first seal welded using shielded metal arc E7016 or E7018 electrodes. The Contractor shall mark this localized portion so that it can be referenced during any required NDT. Backing rings shall have a minimum width of 1 1/2 times the thickness of the pile to be welded or 65 mm, whichever is greater, so that the backing ring will not interfere with the interpretation of the NDT.
- D. For steel pipe with an outside diameter greater than 1.1 m, and with a wall thickness greater than 25.4 mm, the root opening tolerances may be increased to a maximum of 5 mm over the specified tolerances.
- E. Weld filler metal shall conform to the requirements shown in AWS D1.5 for the welding of ASTM Designation: A709/A709M, Grade 345 steel, except that the qualification, pretest, and verification test requirements need not be conducted if certified test reports are provided for the consumables to be used.
- F. For field welding limited to attaching backing rings and handling devices, the preheat and interpass temperature shall be in conformance with the requirements in AWS D1.1, Section 3.5, "Minimum Preheat and Interpass Temperature Requirements," and with Table 3.2, Category C.

- G. The minimum preheat and interpass temperature for production splice welding and for making repairs shall be 66°C, regardless of the pipe pile wall thickness or steel grade. In the event welding is disrupted, preheating to 66°C must occur before welding is resumed.
- H. Welds shall not be water quenched. Welds shall be allowed to cool unassisted to ambient temperature.
- I. Pipe piling designated as ASTM Designation A252, which has a yield strength of less than or equal to 450 MPa, shall be treated as ASTM Designation A572/A572M, Grade 345 material for the purposes of welding and prequalification of base metal, in conformance with the requirements in AWS D1.1.

At the Contractor's option, a steel pipe pile may be re-tapped to prevent pile set-up provided the field welded splice remains at least one meter above the work platform until that splice is approved in writing by the Engineer.

NONDESTRUCTIVE TESTING FOR STEEL PIPE PILING

Steel pipe piling at Abutments 1 and 4 of N215/N259 Connector, Br. No. 54-1240G, shall receive nondestructive testing (NDT) in conformance with these special provisions.

Nondestructive Testing of Welds made at a Permanent Facility

Nondestructive testing of welding performed in conformance with the requirements of API 5L shall conform to the following criteria:

- A. The manufacturer shall provide to the Engineer a VHS videocassette recording of the actual product testing, when radiological testing is utilized, or the actual radiographic film when film radiography is utilized. This videocassette or film submittal shall be provided to the Engineer for review prior to shipment of the product from the manufacturing facility.
- B. Ultrasonic testing of seam welds produced by the electric resistance welding process (ERW) shall comply with API 5L, SR17 utilizing a type V10 notch, N10 notch, or a 3.2 mm drilled hole.
- C. The ultrasonic equipment shall utilize transducers oscillating at frequencies between 2 and 5 megahertz.
- D. When the pipe ends of seam welds produced by the submerged arc welding process (SAW) are inspected by ultrasonic methods in accordance with API 5L Paragraph 9.7.4, the acceptance criteria shall be based on a type N5 notch or a 1.6 mm drilled hole.
- E. When film radiography is utilized to inspect pipe ends or repairs, the transmitted film density shall be 2.0 to 4.0 in the area of interest (weld, base metal, and IQI).
- F. Repaired defects shall be re-inspected utilizing the NDT method that originally detected the defect, except that film radiography may be utilized for inspection of repairs when the defect was originally detected utilizing real time imaging or radiological testing.

Nondestructive testing of welding performed in conformance with AWS D1.1 shall be in conformance with the following criteria:

- A. Twenty-five percent of each longitudinal, circumferential, or spiral weld made at a permanent fabrication facility shall receive NDT. If repairs are required in a portion of the tested weld, the repaired portion shall receive NDT, and additional NDT shall be

- performed on untested portions of the weld. The additional NDT shall be made on both sides of the repair area for a length equal to 10 percent of the length of the pipe's outside circumference. After this additional 20 percent of NDT is performed, and if more repairs are required, the total cumulative repair lengths from all NDT shall be determined and documented. If the cumulative weld repair length is determined to be equal to or more than 10 percent of the length of the pipe outside circumference, then the entire weld shall receive NDT.
- B. Circumferential or longitudinal welds shall receive NDT by either radiographic, real time imaging systems, or ultrasonic methods that are in conformance with the requirements in AWS D1.1.
 - C. The acceptance and repair criteria for ultrasonic testing (UT) shall conform to the requirements in AWS D1.1, Section 6, Table 6.3 for cyclically loaded nontubular connections. The acceptance and repair criteria for radiographic or real time image testing shall conform to the requirements of AWS D1.1 for tensile stress welds.

Nondestructive Testing of Field Welds

Nondestructive testing of field welds shall be in conformance with these special provisions.

Personnel performing ultrasonic testing (UT) for field welds will be required to verify their qualifications prior to performing nondestructive testing by both written and practical exams. Information regarding these exams is available at the Transportation Laboratory.

At the option of the Contractor, either ultrasonic testing (UT) or radiographic testing (RT) shall be used as the method of NDT for splices made by field welding steel pipe piling. This NDT shall be used for each field weld, including welds that are made onto a portion of the steel pipe piling that has been installed and any repair made to a splice weld. Testing shall be done at locations selected by the Engineer. The length of a splice weld, not including repairs, where NDT is to be performed, shall have a cumulative weld length that is equal to 25 percent of the pipe outside circumference. The Engineer may select several locations on a given splice for NDT. The cover pass shall be ground smooth at the locations to be tested. The acceptance and repair criteria for UT shall conform to the requirements in AWS D1.1, Section 6, Table 6.3 for cyclically loaded nontubular connections. The acceptance and repair criteria for radiographic or real time image testing shall conform to the requirements of AWS D1.1 for tensile stress welds. If repairs are required in a portion of the tested weld, the repaired portion shall receive NDT, and additional NDT shall be performed on untested portions of the weld. The additional NDT shall be made on both sides of the repair area for a length equal to 10 percent of the length of the pipe's outside circumference. After this additional 20 percent of NDT is performed, and if more repairs are required, the total cumulative repair lengths from all NDT shall be determined and documented. If the cumulative weld repair length is determined to be equal to or more than 10 percent of the length of the pipe outside circumference, then the entire weld shall receive NDT.

When backing rings are used, the backing ring complete joint penetration splice welds shall be inspected by RT or UT for material of thickness equal to or greater than 8 mm, or by RT for material of thickness less than 8 mm. The acceptance criteria for splice welds in backing rings shall be AWS D1.1, Section 6 and Figure 6.5 for RT, or Table 6.3 for UT.

MEASUREMENT AND PAYMENT (PILING)

Measurement and payment for the various types and classes of piles shall conform to the provisions in Sections 49-6.01, "Measurement," and 49-6.02, "Payment," of the Standard Specifications and these special provisions.

Payment for cast-in-place concrete piling shall conform to the provisions in Section 49-6.02, "Payment," of the Standard Specifications and these special provisions except that, when the diameter of cast-in-place concrete piling is shown on the plans as 600 mm or larger, reinforcement in the piling will be paid for by the kilogram as bar reinforcing steel (bridge).

Full compensation for furnishing and welding shear rings to the top open ended steel shells, as shown on plans, shall be considered as included in the contract unit price paid for furnish steel pipe piling, and no additional compensation will be allowed therefor.

Full compensation for slurry, depositing concrete under slurry, test batches, inspection pipes, filling inspection holes and pipes with grout, drilling oversized cast-in-drilled-hole concrete piling, filling cave-ins and oversized piles with concrete, and redrilling through concrete, shall be considered as included in the contract prices paid per meter for cast-in-drilled-hole concrete piling of the types and sizes listed in the Engineer's Estimate, and no additional compensation will be allowed therefor.

Full compensation for furnishing and installing permanent steel casing for Type II pile shafts at 5th ST to S215 On-Ramp (Br. No. 54-1252K) and S259/S215 Connector Replace (Br. No. 54-1239F) due to the Contractor's choice to utilize the optional construction joint shown on the plans shall be considered as included in the contract prices paid per meter for cast-in-drilled-hole concrete piling of the types and sizes listed in the Engineer's Estimate, and no separate payment will be made therefor.

Full compensation for cleaning out the open ended steel shells of steel pipe piling prior to installing reinforcement and filling with concrete, for disposing of materials removed from the inside of the pile, and for placing seal course concrete and dewatering the open ended steel shells, as shown on the plans, as specified in these special provisions, and as directed by the Engineer, shall be considered as included in the contract unit price paid for drive pile, and no additional compensation will be allowed therefor.

Full compensation for furnishing and placing concrete and reinforcement in steel pipe piling as shown on the plans, as specified in these specifications, and as directed by the Engineer, shall be considered as included in the contract price paid per meter for furnish steel pipe piling, and no additional compensation will be allowed therefor.

Full compensation for conforming to the provisions in "Steel Pipe Piling" and "Nondestructive Testing" of these special provisions shall be considered as included in the contract prices paid for the various items of work involved, and no additional compensation will be allowed therefor.

Full compensation for driving system submittals shall be considered as included in the contract unit price paid for drive pile, and no additional compensation will be allowed therefor.

10-1.62 PRESTRESSING CONCRETE

Prestressing concrete shall conform to the provisions in Section 50, "Prestressing Concrete," of the Standard Specifications and these special provisions.

The details shown on the plans for cast-in-place prestressed box girder bridges are based on a bonded full length draped tendon prestressing system. For these bridges the Contractor may, in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard

Specifications, propose an alternative prestressing system utilizing bonded partial length tendons provided the proposed system and associated details meet the following requirements:

- A. The proposed system and details shall provide moment and shear resistances at least equal to those used for the design of the structure shown on the plans.
- B. The concrete strength shall not be less than that shown on the plans.
- C. Not less than 35 percent of the total prestressing force at any section shall be provided by full length draped tendons.
- D. Anchorage blocks for partial length tendons shall be located so that the blocks will not interfere with the placement of the utility facilities shown on the plans or of any future utilities to be placed through openings shown on the plans.
- E. Temporary prestressing tendons, if used, shall be detensioned, and the temporary ducts shall be filled with grout before completion of the work. Temporary tendons shall be either removed or fully encased in grout before completion of the work.
- F. All details of the proposed system, including supporting checked calculations, shall be included in the drawings submitted in conformance with the provisions in Section 50-1.02, "Drawings," of the Standard Specifications.

Moments and shears for loads used in the design shown on the plans will be made available to the Contractor upon written request to the Engineer.

10-1.63 CONCRETE STRUCTURES

Portland cement concrete structures shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

GENERAL

Attention is directed to "Precast Concrete Quality Control" of these special provisions.

Unless otherwise specified, supplementary cementitious material will not be required in portland cement concrete used for precast concrete girders.

The Contractor will be permitted to use Type III portland cement for concrete used in the manufacture of precast concrete girders.

Shotcrete shall not be used as an alternative construction method for reinforced concrete members unless otherwise specified.

When a roughened concrete surface is shown on the plans, the existing concrete surface shall be roughened to a full amplitude of approximately 6 mm by abrasive blasting, water blasting, or mechanical equipment.

Neoprene strip shall be furnished and installed at abutment backwall joint protection in conformance with the details shown on the plans, the provisions in the Standard Specifications, and these special provisions.

Furnishing and installing neoprene strip shall conform to the requirements for strip waterstops as provided in Section 51-1.145, "Strip Waterstops," of the Standard Specifications, except that the protective board will not be required.

Forms used to support the deck of cast-in-place box girders or to form the voids of precast members for the following structures may remain in place, provided the portions of the forms that obstruct access openings or conflict with utility facilities are removed, the forming system employed leaves no sharp projections into the cells or voids, and forms between hinges and 1.5 m beyond access openings adjacent to hinges are removed:

RIALTO AVENUE UC (N215 TO 2ND ST OFF-RAMP), Bridge Number 54-1255S

RIALTO AVENUE UC (S215 TO 2ND ST ON-RAMP), Bridge Number 54-1256K

9TH STREET OC (REPLACE), Bridge Number 54-1222

BASELINE STREET OC (REPLACE), Bridge Number 54-1223

SB BASELINE STREET ON-RAMP, Bridge Number 54-1224

SB BASELINE STREET OFF-RAMP, Bridge Number 54-1225

Materials for access opening covers in soffits of new cast-in-place concrete box girder bridges shall conform to the provisions for materials in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

Vertical, horizontal, radial, or normal dimensions shown on the Typical Section in the plans are for zero percent cross slope. At the Contractor's option, the Typical Section of superelevated concrete box girder structures with (1) sloping exterior girders, (2) a straight uninterrupted cross slope between edges of deck, and (3) a single profile grade line, may be rotated around the profile grade line in superelevation areas. The horizontal distances between the profile grade line and the edges of deck shall remain unchanged. The planned girder widths and slab thicknesses shall remain unchanged and the interior girder stems shall remain vertical at the planned locations.

DECK CRACK TREATMENT

When methacrylate resin work is to be conducted within 31 meters of a residence, business, or public space, including sidewalks under a structure, the Contractor shall notify the public at least 7 days before starting work and monitor airborne emissions during the work. Public notification and monitoring of airborne emissions shall conform to the following:

- A. The public safety plan required in Section 51-1.17A, "Deck Crack Treatment," of the Standard Specifications shall include a copy of the notification letter and a list of addresses and locations where the letter will be delivered and posted. The letter shall state the methacrylate resin work locations, dates, times, and what to expect. The letter shall be delivered to each residence and each business within 31 meters of the methacrylate resin work. The letter shall be delivered to local fire and police responders, and it shall be posted at the job site.
- B. The public safety plan shall include an airborne emissions monitoring plan prepared by a certified industrial hygienist and a copy of the hygienist's certification. Airborne emissions shall be monitored at a minimum of 4 points including the point of mixing, the point of application, and the point of nearest public contact, as determined by the Engineer. At the completion of methacrylate resin work, a report by the certified industrial hygienist with results of the airborne emissions monitoring plan shall be submitted to the Engineer.

AGGREGATE GRADINGS

The aggregate grading of concrete for Cast-In-Drilled-Hole pilings shall be the 25mm maximum combined aggregate grading and shall conform to the requirements in Section 90-3, "Aggregate Gradings," of the Standard Specifications.

Full compensation for furnishing and constructing Slurry Cement Backfill shall be considered as included in the contract cubic meter prices paid for Minor Concrete (Minor Structure) and no additional compensation will be allowed therefor.

FALSEWORK

Falsework shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Attention is directed to "Railroad Relations and Insurance" of these special provisions for additional requirements for falsework over railroads.

In addition to the provisions in Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications, the time to be provided for the Engineer's review of the working drawings for specific structures, or portions thereof, shall be as follows:

Structure or Portion of Structure	Total Review Time - Weeks
RIALTO AVE UC (WIDEN) (BRIDGE NO. 54-0488)	6
REDLANDS LOOP OH (WIDEN) (BRIDGE NO. 54-0489)	6
N215 TO 5 TH ST OFF-RAMP (BRIDGE NO. 54-1251S)	6
5 TH STREET TO S215 ON-RAMP (BRIDGE NO. 54-1252K)	6
S215 TO 5 TH ST OFF-RAMP (BRIDGE NO. 54-1253K)	6
REDLANDS LOOP OH N215 TO 2 ND ST OFF-RAMP (BRIDGE NO. 54-1254S)	12
RAILTO AVE UC – N215 TO 2 ND ST OFF-RAMP (BRIDGE NO. 54-1255S)	6
RAILTO AVE UC – S215 TO 2 ND ST ON-RAMP (BRIDGE NO. 54-1256K)	6
SECOND STREET UC (REPLACE) (BRIDGE NO. 54-1259)	6
THIRD STREET UC (REPLACE) (BRIDGE NO. 54-1260)	6
9 TH STREET OC (REPLACE) (BRIDGE NO. 54-1222)	12
BASELINE STREET OC (REPLACE) (BRIDGE NO. 54-1223)	12
SB BASELINE ST ON-RAMP (BRIDGE NO. 54-1224)	6
SB BASELINE ST OFF-RAMP (BRIDGE NO. 54-1225)	6
S259/S215 CONNECTOR (REPLACE) (BRIDGE NO. 54-1239F)	6
N215/S259 CONNECTOR (BRIDGE NO. 54-1240G)	6
16 TH STREET OC/OH (REPLACE) (BRIDGE NO. 54-1241)	12

Temporary crash cushion modules, as shown on the plans and conforming to the provisions in "Temporary Crash Cushion Module" of these special provisions, shall be installed at the approach end of temporary railings which are located less than 4.6 m from the edge of a traffic lane. For 2-way traffic openings, temporary crash cushion modules shall be installed at the departing end of temporary railings which are located less than 1.8 m from the edge of a traffic lane.

The Contractor's engineer who signs the falsework drawings shall also certify in writing that the falsework is constructed in conformance with the approved drawings and the contract specifications prior to placing concrete. This certification shall include performing any testing necessary to verify the ability of the falsework members to sustain the stresses required by the falsework design. The engineer who signs the drawings may designate a representative to perform this certification. Where falsework contains openings for railroads, vehicular traffic, or pedestrians, the designated representative shall be qualified to perform this work, shall have at least three years of combined experience in falsework design or supervising falsework construction, and shall be registered as a Civil Engineer in the State of California. For other

falsework, the designated representative shall be qualified to perform this work and shall have at least three years of combined experience in falsework design or supervising falsework construction. The Contractor shall certify the experience of the designated representative in writing and provide supporting documentation demonstrating the required experience if requested by the Engineer.

Welding and Nondestructive Testing

Welding of steel members, except for previously welded splices and except for when fillet welds are used where load demands are less than or equal to 175 N/mm for each 3 mm of fillet weld, shall conform to AWS D1.1 or other recognized welding standard. The welding standard to be utilized shall be specified by the Contractor on the working drawings. Previously welded splices for falsework members are defined as splices made prior to the member being shipped to the project site.

Splices made by field welding of steel beams at the project site shall undergo nondestructive testing (NDT). At the option of the Contractor, either ultrasonic testing (UT) or radiographic testing (RT) shall be used as the method of NDT for each field weld and any repair made to a previously welded splice in a steel beam. Testing shall be performed at locations selected by the Contractor. The length of a splice weld where NDT is to be performed, shall be a cumulative weld length equal to 25 percent of the original splice weld length. The cover pass shall be ground smooth at the locations to be tested. The acceptance criteria shall conform to the requirements of AWS D1.1, Section 6, for cyclically loaded nontubular connections subject to tensile stress. If repairs are required in a portion of the weld, additional NDT shall be performed on the repaired sections. The NDT method chosen shall be used for an entire splice evaluation including any required repairs.

For all field welded splices, the Contractor shall furnish to the Engineer a letter of certification which certifies that all welding and NDT, including visual inspection, are in conformance with the specifications and the welding standard shown on the approved working drawings. This letter of certification shall be signed by an engineer who is registered as a Civil Engineer in the State of California and shall be provided prior to placing any concrete for which the falsework is being erected to support.

For previously welded splices, the Contractor shall determine and perform all necessary testing and inspection required to certify the ability of the falsework members to sustain the stresses required by the falsework design. This welding certification shall (1) itemize the testing and inspection methods used, (2) include the tracking and identifying documents for previously welded members, (3) be signed by an engineer who is registered as a Civil Engineer in the State of California, (4) and shall be provided prior to erecting the members.

10-1.64 JACKING SUPERSTRUCTURE

Jacking superstructure shall consist of lowering the superstructure of Second Street Undercrossing (Bridge No. 54-1259) and Third Street Undercrossing (Bridge No. 54-1260) as shown on the plans and in accordance with the requirements in these special provisions.

The Contractor shall design, furnish, construct, monitor, maintain, and remove the temporary supports for the superstructure and determine the methods and equipment for lowering the superstructure in conformance with the requirements in these special provisions.

Construction sequence and application of temporary support jacking loads shall be as shown on the plans. Proposed changes to the construction sequence and application of temporary support jacking loads shall be subject to the Engineer's approval.

Temporary supports shall include jacking assemblies and appurtenant items necessary to jack and support the structures.

Attention is directed to the sections "Order of Work" and "Maintaining Traffic" of these special provisions regarding the construction sequences and the required openings in temporary supports for the use of public traffic.

Approval by the Engineer of the temporary support working drawings or temporary support inspection performed by the Engineer will in no way relieve the Contractor of full responsibility for the temporary supports.

TEMPORARY SUPPORT DESIGN AND DRAWINGS

The Contractor shall submit to the Engineer working drawings and design calculations for the temporary supports. Such drawings and design calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California. The temporary support working drawings and design calculations shall conform to the requirements in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The number of sets of drawings and design calculations and times for review for temporary supports shall be the same as specified for falsework working drawings in Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications.

In addition to the requirements in Section 51-1.06A, "Falsework Design and Drawings," of the Standard Specifications, the following requirements shall apply:

- A. The time to be provided for the Engineer's review of the working drawings for specific structures, or portions thereof, shall be as follows:

Structure or Portion of Structure	Review Time - Weeks
Second Street UC (Replace) Bridge No. 54-1259	5
Third Street UC (Replace) Bridge No. 54-1260	5

Working drawings for any part of the temporary supports shall include stress sheets, anchor bolt layouts, shop details, and erection and removal plans.

The temporary support working drawings shall include descriptions and values of all loads, including construction equipment loads, descriptions of equipment to be used, complete details and calculations for jacking and supporting the structure, and descriptions of the displacement monitoring system. The displacement monitoring system shall include equipment to be used, location of control points, method and schedule of taking measurements.

Systems involving modifications to the bridge that impair the structural integrity, intended serviceability or design capacity of the bridge shall not be used.

A redundant system of supports shall be provided during the entire jacking operation for backup should any of the jacks fail. The redundant system shall include stacks of steel plates added as necessary to maintain the redundant supports at each jack location within 6 mm of the jacking sill or corbels.

For temporary supports over railroads, approval by the Engineer of the temporary support drawings will be contingent upon the drawings being satisfactory to the railroad company involved.

When footing type foundations are to be used, the Contractor shall determine the bearing value of the soil and shall show the values assumed in the design of the temporary supports on the temporary support drawings. Anticipated temporary support foundation settlement shall be shown on the temporary support drawings.

When pile type foundations are to be used, the temporary support drawings shall show the maximum horizontal distance that the top of a temporary support pile may be pulled in order to position it under its cap. The temporary support drawings shall also show the maximum allowed deviation of the top of the pile, in its final position, from a vertical line through the point of fixity of the pile.

The Contractor may use the permanent piles as part of the temporary support foundation. Permanent piles shall not be moved or adjusted from the locations shown on the plans. Any use of the permanent piles and the loads imposed on them shall be shown on the temporary support drawings. Should the Contractor propose to provide piles longer than required for the work in order to support the temporary supports above the elevation of the top of the footing and later cut off the piles at their final elevation, shear devices adequate to transfer all pile reactions into the footing will be required.

Temporary support footings shall be designed to carry the load imposed upon them without exceeding the estimated soil bearing values and anticipated settlements.

Bracing shall be provided, as necessary, to withstand all imposed loads during erection and removal of any temporary supports. The temporary support drawings shall show provisions for such temporary bracing or methods to be used to conform to these requirements during each phase of erection and removal. Wind loads shall be included in the design of such bracing or methods. Wind loads shall conform to the applicable provisions in Section 51-1.06A(1), "Design Loads," of the Standard Specifications.

The temporary support design calculations shall show a summary of computed stresses in the (1) temporary supports, (2) connections between temporary supports and the structure, and (3) permanent structural members. The computed stresses shall include the effect of the jacking sequence. The temporary support design calculations shall also include a lateral stiffness assessment of the temporary support system and conform to the design values shown on the plans.

The design of temporary supports will not be approved unless it is based on the use of loads and conditions which are no less severe than those described in "Temporary Support Design Criteria," of these special provisions and on the use of allowable stresses which are no greater than those described in Section 51-1.06A(2), "Design Stresses, Loadings, and Deflections," of the Standard Specifications.

If falsework loads are imposed on temporary supports, the temporary supports shall also satisfy the deflection criteria described in Section 51-1.06A(2), "Design Stresses, Loadings, and Deflections," of the Standard Specifications.

TEMPORARY SUPPORT DESIGN CRITERIA

The temporary supports shall support the initial jacking loads and the minimum temporary support design loads and the minimum lateral design forces shown on the plans. The vertical design loads shall be adjusted for the weight of temporary supports and jacks, construction equipment loads and additional loads imposed by the Contractor's operations. The construction equipment loads shall be the actual weight of the construction equipment but in no case shall be less than 960 N/m^2 of deck surface area of the frame involved. A frame is defined as the portion of the bridge between expansion joints.

The temporary supports shall resist the specified lateral design forces shown on the plans. The lateral design forces to be resisted shall be increased to be compatible with the temporary support lateral stiffness if the stiffness exceeds the specified minimum. The temporary supports resisting transverse lateral loads shall be placed within a distance of not more than 0.5 of the span length from the bent. The temporary supports resisting longitudinal lateral loads shall be placed within the each frame.

The structure shall be mechanically connected to the temporary supports. The temporary supports shall be mechanically connected to their foundations. The mechanical connections shall be capable of resisting the lateral temporary support design forces. Friction forces developed between the existing structure and temporary supports shall not be used to reduce the lateral forces and shall not be considered as an effective mechanical connection. The mechanical connections shall be designed to tolerate adjustments to the temporary support frame throughout the use of the temporary supports.

If falsework loads are imposed on temporary supports, the temporary supports shall be designed to support the additional loads caused by the prestressing forces.

Manufactured Assemblies

Manufactured assemblies shall conform to the provisions in Section 51-1.06A(2), "Design Stresses, Loadings, and Deflections," of the Standard Specifications and these special provisions.

Each jack shall be equipped with either a pressure gage or a load cell for determining the jacking force. Pressure gages shall have an accurately reading dial at least 150 mm in diameter. Each jack shall be calibrated by a private laboratory approved by the Transportation Laboratory within 6 months prior to use and after each repair. Each jack and its gage shall be calibrated as a unit with the cylinder extension in the approximate position that it will be at final jacking force and shall be accompanied by a certified calibration chart. Load cells shall be calibrated and provided with an indicator by which the jacking force is determined.

SPECIAL LOCATIONS

Attention is directed to Section 51-1.06A(3), "Special Locations," of the Standard Specifications. All reference to falsework in this section shall also apply to temporary supports.

TEMPORARY SUPPORT CONSTRUCTION

Attention is directed to section "Falsework" of these special provisions and to paragraphs 1 through 7 of Section 51-1.06B, "Falsework Construction," of the Standard Specifications. All reference to falsework in these paragraphs shall also apply to temporary supports.

Prior to proceeding with jacking operations, an engineer for the Contractor who is registered as a Civil Engineer in the State of California shall inspect the temporary supports, including jacking and displacement monitoring systems, for conformance with the working drawings. The Contractor's registered engineer shall certify in writing that the temporary supports, including jacking and displacement monitoring systems, conform to the working drawings, and that the material and workmanship are satisfactory for the purpose intended. A copy of this certification shall be available at the site of the work at all times.

The Contractor's registered engineer shall be present at the bridge site at all times when jacking operations or adjustments are in progress. The Contractor's registered engineer shall inspect the jacking operation and report in writing on a daily basis the progress of the operation and the status of the remaining structure. A copy of the daily report shall be available at the site of the work at all times. Should an unplanned event occur, the Contractor's registered engineer

shall submit immediately to the Engineer for approval, the procedure or proposed operation to correct or remedy the occurrence.

The Contractor shall perform an initial survey as part of the displacement monitoring system to record the location of the structure prior to the jacking operations. Two copies of the survey shall be signed by an engineer, who is registered as a Civil Engineer in the State of California, and submitted to the Engineer.

Vandal-resistant displacement monitoring equipment shall be provided and maintained. Vertical and horizontal displacements of the temporary supports and the structure shall be monitored continuously during jacking operations. As a minimum, elevations shall be taken prior to the start of jacking operations, immediately after jacking is complete, and before connecting the superstructure to the substructure, and after the temporary supports have been removed. As a minimum, structure shall be monitored at the abutments and midspan. Control points at each location shall be located near the center and at both edges of the superstructure. The records of vertical and horizontal displacement shall be signed by an engineer who is registered as a Civil Engineer in the State of California and available to the Engineer at the jobsite during normal working hours, and a copy of the record shall be delivered to the Engineer at the completion of reconstructing each stage.

A force equal to the initial jacking load or the dead load shown on the plans shall be applied to the structure by the temporary support system and held until all initial compression and settlement of the system is completed before falsework removal is begun.

LOWERING OPERATIONS

Jacking operations shall be carefully controlled and monitored to ensure that the jacking loads are applied simultaneously to prevent distortion and excessive stresses that would damage the structure. The superstructure shall be jacked as necessary to control vertical displacements at control points to ensure that relative displacements are not allowed to exceed 6 mm between any two control points at one abutment, nor 13 mm between any two control points located on opposite abutments unless approved in writing by the Engineer.

The superstructure shall be lowered to the position shown on the plans so that the load is distributed uniformly across each abutment. Galvanized shims shall be placed as approved by the Engineer, when required to provide uniform loading at bearing pads.

Should unanticipated displacements, cracking or other damage occur, the construction shall be discontinued until corrective measures satisfactory to the Engineer are performed. Damage to the structure as a result of the Contractor's operations shall be repaired by the Contractor in conformance with the provisions in Section 7-1.11, "Preservation of Property," of the Standard Specifications.

REMOVING TEMPORARY SUPPORTS

Attention is directed to Section 51-1.06C, "Removing Falsework," of the Standard Specifications. All references to falsework in this section shall also apply to temporary supports.

After lowering the superstructure, attachments to the structure for the jacking operations shall be removed and the concrete surfaces shall be finished

PAYMENT

The contract lump sum price paid for jacking superstructure shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in designing, constructing, maintaining, and removing the temporary supports, including jacking the structure and monitoring displacements, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

COST REDUCTION INCENTIVE PROPOSALS FOR CAST-IN-PLACE PRESTRESSED BOX GIRDER BRIDGES

Except as provided herein, cast-in-place prestressed box girder bridges shall be constructed in conformance with the details shown on the plans and the provisions in Section 50, "Prestressing Concrete," and Section 51, "Concrete Structures," of the Standard Specifications.

If the Contractor submits cost reduction incentive proposals for cast-in-place prestressed box girder bridges, the proposals shall be in conformance with the provisions in Section 5-1.14, "Cost Reduction Incentive," of the Standard Specifications and these special provisions.

The Engineer may reject any proposal which, in the Engineer's judgment, may not produce a structure which is at least equivalent to the planned structure.

At the time the cost reduction incentive proposal (CRIP) is submitted to the Engineer, the Contractor shall also submit 4 sets of the proposed revisions to the contract plans, design calculations, and calculations from an independent checker for all changes involved in the proposal, including revisions in camber, predicted deck profile at each construction stage, and falsework requirements to the Office of Structure Design, Documents Unit, P.O. Box 942874, Sacramento, CA 94274-0001 (1801 30th Street, Sacramento, CA 95816), telephone (916) 227-8230. When notified in writing by the Engineer, the Contractor shall submit 12 sets of the CRIP plan revisions and calculations to the Office of Structure Design for final approval and use during construction. The calculations shall verify that all requirements are satisfied. The CRIP plans and calculations shall be signed by an engineer who is registered as a Civil Engineer in the State of California.

The CRIP plans shall be either 279 mm x 432 mm, or 559 mm x 864 mm in size. Each CRIP plan sheet and calculation sheet shall include the State assigned designations for the contract number, bridge number, full name of the structure as shown on the contract plans, and District-County-Route-Kilometer Post. Each CRIP plan sheet shall be numbered in the lower right hand corner and shall contain a blank space in the upper right hand corner for future contract sheet numbers.

Within 3 weeks after final approval of the CRIP plan sheets, one set of the corrected good quality prints on 75-g/m² (minimum) bond paper, 559 mm x 864 mm in size, of all CRIP plan sheets prepared by the Contractor for each CRIP shall be furnished to the Office of Structure Design, Documents Unit.

Each CRIP shall be submitted prior to completion of 25 percent of the contract working days and sufficiently in advance of the start of the work that is proposed to be revised by the CRIP to allow time for review by the Engineer and correction by the Contractor of the CRIP plans and calculations without delaying the work. The Contractor shall allow a minimum of 12 weeks for the review of a CRIP. In the event that several CRIPs are submitted simultaneously, or an additional CRIP is submitted for review before the review of a previously submitted CRIP has been completed, the Contractor shall designate the sequence in which the CRIPs are to be reviewed. In this event, the time to be provided for the review of any proposal in the sequence shall be not less than the review time specified herein for that proposal, plus 2 weeks for each CRIP of higher priority which is still under review.

Should the review not be complete by the date specified in the Contractor's CRIP, or such other date as the Engineer and Contractor may subsequently have agreed to in writing and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in review of CRIP plans and calculations, an extension of time commensurate with the delay in completion of the work thus caused will be granted as provided in Section 8-1.07, "Liquidated Damages," of the Standard Specifications except that the

provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications shall not apply.

Permits and approvals required of the State have been obtained for the structures shown on the plans. Proposals which result in a deviation in configuration may require new permits or approvals. The Contractor shall be responsible for obtaining the new permits and approvals before the Engineer will reach a decision on the proposal. Delays in obtaining permits and approvals will not be reason for granting an extension of contract time.

All proposed modifications shall be designed in conformance with the bridge design specifications and procedures currently employed by the Department. The proposal shall include all related, dependent or incidental changes to the structure and other work affected by the proposal. The proposal will be considered only when all aspects of the design changes are included for the entire structure. Changes, such as but not limited to, additional reinforcement and changes in location of reinforcement, necessary to implement the CRIP after approval by the Engineer, shall be made at the Contractor's expense.

Modifications may be proposed in (1) the thickness of girder stems and deck slabs, (2) the number of girders, (3) the deck overhang dimensions as specified herein, (4) the amount and location of reinforcing steel, (5) the amount and location of prestressing force in the superstructure, and (6) the number of hinges, except that the number of hinges shall not be increased. The strength of the concrete used may be increased but the strength employed for design or analysis shall not exceed 42 MPa.

Modifications proposed to the minimum amount of prestressing force which must be provided by full length draped tendons are subject to the provisions in "Prestressing Concrete" of these special provisions.

No modifications will be permitted in (1) the foundation type, (2) the span lengths or (3) the exterior dimensions of columns or bridge superstructure, except that the overhang dimension from face of exterior girder to the outside edge of roadway deck may be uniformly increased or decreased by 25 percent on each side of the box girder section. Fixed connections at the tops and bottoms of columns shown on the plans shall not be eliminated.

The Contractor shall be responsible for determining construction camber and obtaining the final profile grade as shown on the plans.

The Contractor shall reimburse the State for the actual cost of investigating CRIPs for cast-in-place prestressed box girder bridges submitted by the Contractor. The Department will deduct this cost from any moneys due, or that may become due the Contractor under the contract, regardless of whether or not the proposal is approved or rejected.

PERMANENT STEEL DECK FORMS

Forms for the deck slabs between girders of the Redlands Loop OH (Widen), Bridge No. 54-489, at the option of the Contractor, shall either be constructed and removed as provided in Section 51-1.05, "Forms," of the Standard Specifications, or shall be constructed and left in place in conformance with these special provisions.

Permanent steel deck forms and supports shall be steel conforming to the requirements in ASTM Designation: A653/A653M (Designation SS, Grades 33 through 80) having a coating designation G165. The forms shall be mortar-tight, true to line and grade, and of sufficient strength to support the loads applied.

Detailed working drawings for forms shall be submitted to the Engineer for approval in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. Three sets of drawings shall be submitted. These drawings shall show

the grade of steel, the physical and section properties for all deck members, the method of support and grade adjustment, accommodation for skew, and methods of sealing against grout leaks.

Working drawings shall be submitted sufficiently in advance of the start of the affected work to allow time for review by the Engineer and correction by the Contractor of the drawings without delaying the work. Such time shall be proportional to the complexity of the work but in no case shall such time be less than 3 weeks after complete drawings and all support data are submitted.

The design of permanent steel deck forms shall be based on the combined dead load of the forms, reinforcement, and plastic concrete plus an allowance for all anticipated construction loads. The allowance for construction loads shall be not less than 2400 Pa. The combined dead load shall be assumed to be not less than 2560 kg/m³ for normal concrete and not less than 2080 kg/m³ for lightweight concrete.

Physical design properties shall be computed in conformance with the requirements of the AISI specification for the "Design of Cold Formed Steel Structural Members."

The maximum allowable stresses and deflections used in the design of steel forms shall be as follows:

- A. Tensile stress shall not exceed 0.725 of the specified yield strength of the material furnished or 250 MPa.
- B. Deflection due to dead load shall not exceed 0.0056 of form span or 13 mm, whichever is less. In no case shall the dead load for deflection calculations be less than 5750 Pa total.
- C. Form camber, used at the option of the Contractor, shall be based on the actual dead load condition. Camber shall not be used to compensate for deflection in excess of the allowable limits.
- D. The design span of the form sheets shall be the clear span of the form plus 50 mm measured parallel to the form flutes.

Permanent steel deck forms shall not be used for those sections of deck slabs that contain a longitudinal expansion joint unless additional supports are placed under the joint.

Permanent steel deck forms shall not interfere with the movement at deck expansion joints.

The clearance between the surface of permanent forms and any bar reinforcement shall be not less than 25 mm. The configuration of the forms shall be such that the mass of deck slab is not more than 110 percent of the mass of the total deck slab as dimensioned on the plans.

Permanent steel deck forms shall be installed in conformance with the approved working drawings.

Form sheets shall not rest directly on the top of the girder flanges. Sheets shall be securely fastened to form supports and shall have a minimum bearing length of 25 mm at each end. Form supports shall be placed in direct contact with the flange of the girder. Attachment of supports shall be made by bolts, clips or other approved means.

Transverse deck construction joints shall be located at the bottom of a flute and 6-mm weep holes shall be field drilled at not less than 300 mm on center along the line of the joint.

Permanently exposed galvanized form surfaces that are abraded or damaged prior to installation shall be repaired by thoroughly wire brushing the damaged areas and removing all loose and cracked coating, after which the cleaned areas shall be painted with 2 applications of unthinned zinc-rich primer (organic vehicle type) conforming to the provisions in Section 91, "Paint," of the Standard Specifications. Aerosol cans shall not be used. Minor heat discoloration in area of welds need not be repaired.

DECK CLOSURE POURS

Where a deck closure pour is shown on the plans, reinforcement protruding into the closure space and forms for the closure pour shall conform to the following:

- A. During the time of placement of concrete in the deck, other than for the closure pour itself, reinforcing steel which protrudes into the closure space shall be completely free from any connection to the reinforcing steel, concrete, or other attachments of the adjacent structure, including forms. The reinforcing steel shall remain free of any connection for a period of not less than 24 hours following completion of the pour.
- B. Forms for the closure pour shall be supported from the superstructure on both sides of the closure space.

SLIDING JOINTS

Sliding joints consisting of a neoprene strip lubricated with grease and covered with sheet metal shall conform to the following requirements:

- A. Neoprene strip shall conform to the requirements for neoprene in Section 51-1.14, "Waterstops," of the Standard Specifications.
- B. Grease shall conform to the requirements of Society of Automotive Engineers AS 8660. A uniform film of grease shall be applied to the upper surface of the neoprene strip prior to placing the sheet metal.
- C. Sheet metal shall be commercial quality galvanized sheet steel. The sheet metal shall be smooth and free of kinks, bends, or burrs. Joints in the sheet metal shall be butt joints sealed with plastic duct sealing tape.
- D. Construction methods and procedures shall prevent grout or concrete seepage into the sliding joint assembly.
- E. The concrete surfaces on which the neoprene strips will be placed shall be floated to a level plane and finished with a steel trowel.

SLIDING BEARINGS

Sliding bearings consisting of elastomeric bearing pads lubricated with grease and covered with sheet metal shall conform to the following requirements:

- A. Grease shall conform to the requirements of Military Specification: MIL-S-8660. A uniform film of grease shall be applied to the upper surface of the pads prior to placing the sheet metal.
- B. Sheet metal shall be commercial quality galvanized sheet steel. The sheet metal shall be smooth and free of kinks, bends, or burrs.
- C. Construction methods and procedures shall prevent grout or concrete seepage into the sliding bearing assembly.

ELASTOMERIC BEARING PADS

Elastomeric bearing pads shall conform to the provisions in Section 51-1.12H, "Elastomeric Bearing Pads," of the Standard Specifications.

The epoxy adhesive shall be furnished and applied in conformance with the provisions in Section 95-1, "General," and Section 95-2.03, "Epoxy Resin Adhesive for Bonding New Concrete to Old Concrete," of the Standard Specifications. The adhesive shall be worked onto the surface with stiff brushes or equal.

PRECAST CONCRETE GIRDERS

Precast reinforced concrete girders shall conform to the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

PRECAST PRESTRESSED CONCRETE BRIDGE MEMBERS

Before curing operations, the top surface of each member shall be given a coarse texture by brooming with a stiff bristled broom or by other suitable devices that will result in uniform transverse scoring. When precast prestressed concrete girders with a concrete deck are shown on the plans, surfaces noted to be given a coarse broom finish shall be cleaned of surface laitance and curing compound before placing deck concrete. Exposure of clean aggregate will not be required.

The anticipated deflection and method of accommodation of deflection of precast prestressed concrete girders, prior to the time the deck concrete is placed, shall be shown on the working drawings in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The deflection shall include the following:

- A. Anticipated upward deflection caused by the prestressing forces.
- B. Downward deflection caused by the dead load of the girder.
- C. Deflection caused by the creep and shrinkage of the concrete for the time interval between the stressing of the girders and the planned placement of the deck.

The deflection shall be substantiated by calculations that consider the ages of the girder concrete at the time of stressing and the Contractor's planned placement of the deck. Deflection calculations shall be based on the concrete producer's estimate of the modulus of elasticity at the applicable concrete age.

Adjustments to accommodate girder deflections that occur prior to the time the deck concrete is placed may include revisions in bearing seat elevations, but the adjustments shall be limited by the following conditions:

- A. The minimum permanent vertical clearance under the structure as shown on the plans shall not be reduced.
- B. The profile grade and cross slope of the deck shall not be changed.
- C. A minimum of 25 mm of deck slab concrete between the top of the precast girders and the deck slab reinforcement shall be maintained.

Girders with unanticipated girder deflection that do not comply with conditions A, B, and C will be rejected in conformance with the provisions in Section 6-1.04, "Defective Materials," of the Standard Specifications.

Adjustments to accommodate girder deflections will not be considered a change in dimensions. Full compensation for increases in the cost of construction, including increases in the quantity of deck or bearing seat concrete, resulting from adjustments to accommodate girder deflections shall be considered as included in the contract prices paid for the various items of work involved, and no additional compensation will be allowed therefor.

The Contractor shall submit a girder erection plan to the Engineer for approval in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The girder erection plan shall include procedures, details, and sequences for unloading, lifting, erecting, and installing temporary bracing, and shall be signed by an engineer who is registered as a Civil Engineer in the State of California. The Contractor shall allow 20 days for the review of the girder erection plan.

Temporary lateral bracing shall be provided for girders located over the railroad property, and over existing railroad track at the Redlands Loop (Widen) bridge (Bridge # 54-489). The bracing shall be installed at a minimum at each end of each girder segment and at midspan. The bracing shall be in place prior to the release of the erection equipment from the girder and shall remain in place until 48 hours after the concrete diaphragms have been placed. The bracing shall be designed to prevent overturning of the girders prior to completion of the work and to resist the following lateral pressures applied at the top of the girder in either direction:

Structure Height, H (meters above ground)	Lateral Pressure (Pa)
$0 < H \leq 9$	720
$9 < H \leq 15$	960
$15 < H \leq 30$	1200
$H > 30$	1440

MEASUREMENT AND PAYMENT

Measurement and payment for concrete in structures shall conform to the provisions in Section 51-1.22, "Measurement," and Section 51-1.23, "Payment," of the Standard Specifications and these special provisions.

Full compensation for roughening existing concrete surfaces to a full amplitude of approximately 6 mm, where shown on the plans, shall be considered as included in the contract price paid per cubic meter for structural concrete, bridge and no separate payment will be made therefor.

Full compensation for furnishing and installing access opening covers in soffits of new cast-in-place box girder bridges shall be considered as included in the contract price paid per cubic meter for structural concrete, bridge and no separate payment will be made therefor.

Full compensation for furnishing and constructing permanent steel deck forms shall be considered as included in the contract price paid per cubic meter for structural concrete, bridge and no additional compensation will be allowed therefor.

Full compensation for public notification and airborne monitoring for deck crack treatment shall be considered as included in the contract price paid per cubic meter for structural concrete, bridge, and no additional compensation will be allowed therefor.

Concrete and bar reinforcing steel for the floating slab will be measured and paid for by the cubic meter as structural concrete, bridge and by the kilogram as bar reinforcing steel (bridge), respectively.

Full Compensation for removing concrete, trimming rebar and patching holes at existing shear key of Redlands Loops Overhead (Widen) to construct the closure pour shall be considered as included in the contract price paid per cubic meter for structural concrete, bridge, and no additional compensation will be allowed therefor.

Full compensation for Epoxy Adhesive for bonding the Elastomeric Bearing Pads at bents at Redlands Loop Overhead (Widen) shall be considered as included in the contract price paid for Each Elastomeric Bearing Pad, and no additional compensation will be allowed therefor.

10-1.65 PTFE BEARING

PTFE bearings, consisting of steel reinforced elastomeric bearing pads, polytetrafluoroethylene (PTFE) surfacing, and stainless steel and steel plates, shall conform to the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications, and these special provisions.

The Contractor shall submit working drawings for the PTFE bearings to the Offices of Structure Design, (OSD) for approval in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. For initial review, 6 sets of drawings shall be submitted for railroad bridges and 4 sets shall be submitted for other structures. After review, between 6 and 12 sets, as requested by the Engineer, shall be submitted to OSD for final approval and for use during construction.

Working drawings shall be 279 mm x 432 mm, and each drawing and calculation sheet shall include the name of the structure as shown on the contract plans, District-County-Route, bridge number, and contract number.

Working drawings shall be submitted sufficiently in advance of the start of the affected work to allow time for review by the Engineer and correction by the Contractor of the drawings without delaying the work. The time shall be proportional to the complexity of the work but in no case shall the time be less than 42 days for structures after complete drawings and all support data are submitted. The location of match marks on plate edges shall be shown on the working drawings.

At the completion of each structure on the contract, one set of 279 mm x 432 mm prints on 75-g/m² (minimum) bond paper of the corrected original tracings of all working drawings for each structure shall be furnished to the Engineer. Prints of drawings that are common to more than one structure shall be submitted for each structure. An index prepared specifically for the drawings for each structure containing sheet numbers and titles shall be included on the first print in the set for each structure. Prints for each structure shall be arranged in the order of drawing numbers shown in the index.

The edge of the corrected original tracing image shall be clearly visible and visually parallel with the edges of the page. A clear, legible symbol shall be provided as near to the upper left side of each page as is feasible within the original print to show the amount of reduction and a horizontal and vertical scale shall be provided on each reduced print to facilitate enlargement to original scale.

The manufacturer shall furnish Certificates of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for all material used in the PTFE bearings.

The shear modulus of the elastomer in the elastomeric bearing pads shall be 750±75 kPa.

PTFE sheet shall be made from unfilled PTFE resin and shall conform to the following requirements:

Test	Test Method	Requirements
Tensile strength (Minimum)	ASTM D 4894 or D 4895	19.3 MPa
Elongation (Minimum)	ASTM D 4894 or D 4895	200 %

The PTFE resin shall be virgin material (not reprocessed) meeting the requirements of ASTM Designation: D 4894 or D 4895, with a minimum thickness of 6 mm. Specific gravity shall be from 2.13 to 2.19. Melting point shall be $327\pm 10^{\circ}\text{C}$.

The PTFE sliding surface shall be provided with lubricant dimples with a maximum diameter of 8 mm, a minimum depth of 2 mm, and a maximum depth of one half of the PTFE sheet thickness. The dimples shall be uniformly distributed within the area 6 mm from the edges of the PTFE sheet and occupy between 20 percent and 30 percent of the PTFE sheet area.

Stainless steel plates shall conform to the requirements of ASTM Designation: A 240, Type 304, with a minimum thickness of 3 mm.

Steel plates, except stainless steel, shall conform to the requirements of ASTM Designation: A 709/A 709M.

Stud connectors shall conform to the provisions in Section 55-2, "Materials," of the Standard Specifications.

Welding of structural steel shall conform to the requirements of AWS D1.1. Welding of structural steel to stainless steel shall conform to the requirements of AWS D1.6.

The PTFE sheet shall be adhesive bonded in the recess of steel plate under controlled factory conditions. The adhesive material shall be an epoxy resin conforming to the requirements of Federal Specification: MMM-A-134.

Contact surfaces of PTFE sheet and steel plate to be bonded shall be uniformly roughened to a minimum roughness height value of $6.3\text{ }\mu\text{m}$.

The side of the PTFE sheet to be bonded shall be factory treated by the sodium naphthalene or sodium ammonia process, after the contact surface is roughened.

After completion of the bonding operation the PTFE surface shall be smooth and free from bubbles. The PTFE sheet shall show no signs of delamination and shall be fully bonded within the recess.

The stainless steel plate shall be attached by perimeter welding using Type 309L electrodes. After completion of the weld operation, the stainless steel plate shall be smooth and free from waves.

The flatness of the bearing elements shall be controlled such that upon completion of the bearing assembly, the PTFE/stainless steel sliding interface shall be in full bearing.

The mating surface of the stainless steel plate with the PTFE surfacing shall have a minimum #8 mirror finish determined according to ANSI Standard B46.1. The sliding element of the production bearings shall have a first movement static coefficient of friction not exceeding 0.06 when tested without the coating of silicone grease.

Steel reinforced elastomeric bearing pads shall be fully vulcanized to the steel plates under factory controlled conditions, and the bond shall have a peel-strength of at least 5.3 newtons per millimeter as determined by California Test 663.

Metal surfaces of bearings exposed to the atmosphere and in contact with the structure in the completed work, except stainless steel surfaces, shall be cleaned and painted in conformance

with the provisions in "Clean and Paint Joint Seal Assemblies and PTFE Bearings" of these special provisions.

After installation, the top of the assembly shall be removed and a 1.5 mm thick coating of silicone grease shall be applied to the entire PTFE surface and the bearing reassembled without damage to the mating sliding surfaces. Silicone grease shall conform to the requirements in Military Specification: MIL-S-8660.

Damaged bearings and bearings with scratched mating surfaces shall be returned to the factory for replacement or resurfacing.

Prior to proof testing or painting, all individual components shall be permanently die-stamped on 2 of 4 sides with markings consisting of bearing number and contract number. Each bearing shall have a unique bearing number and match marks on plate edges to insure correct assembly at the job site.

Full sized PTFE bearings shall be proof tested and evaluated for compression and coefficient of initial static friction in the presence of the Engineer. The proof tests shall be performed on samples randomly selected by the Engineer from the production bearings to be used in the work. Proof testing shall be performed by the Contractor at the manufacturer's plant or at an approved laboratory. If proof tests cannot be performed at the specified load, the Contractor shall submit to the Engineer for review and approval a testing plan listing additional physical tests. These tests shall be performed in the presence of the Engineer, and shall demonstrate that the requirements for proof testing at the specified load are satisfied. The Contractor shall give the Engineer at least 7 days notice before beginning proof testing. Proof testing of PTFE bearings shall conform to the following requirements:

- A. One bearing per lot of production PTFE bearings shall be proof tested. A lot is defined as 25 PTFE bearings or fraction thereof of the same type, within a load category.
- B. A load category shall consist of bearings of differing vertical load capacity within a range defined as follows:
 - 1. Bearings with less than or equal to 2225 kN maximum vertical load capacity.
 - 2. Bearings with greater than 2225 kN but less than or equal to 8900 kN maximum vertical load capacity.
 - 3. Bearings with greater than 8900 kN maximum vertical load capacity.
- C. Bearings shall be proof tested for compression and coefficient of friction.
- D. Proof tests for compression: The bearing shall be held for one hour at 1.5 times the maximum vertical load shown on the plans for the bearing.
- E. Proof tests for coefficient of friction: The tests shall be performed at the minimum dead load shown on the plans for the bearing with the test load applied for 12 hours continuously and the test load shall not be reduced or removed prior to friction measurement and the following:
 - 1. The tests shall be arranged to allow measurement of the static coefficient of friction on the first movement of the bearing.
 - 2. The first movement static and dynamic coefficients of friction shall be measured at a sliding speed not exceeding 25 millimeters per minute and shall not exceed the specified coefficient of initial static friction.
 - 3. The test bearings shall be subjected to a minimum of 100 movements of at least 25 mm of relative movement at a sliding speed not exceeding 300 millimeters per minute. After cycling, the first movement static and dynamic coefficients of friction

shall be measured again at a sliding speed not exceeding 25 millimeters per minute and shall not exceed the specified coefficient of initial static friction.

- F. The bearing surfaces shall be cleaned prior to testing.
- G. Proof testing of bearings shall be done after conditioning specimens for 12 hours at $24^{\circ}\pm 3^{\circ}\text{C}$.
- H. The proof tested bearings shall show no visible sign of: (1) bond failure of bearing surfaces, (2) separation or lift-off of plates from each other or from PTFE surfaces, (3) excessive transfer of PTFE to the stainless steel surface, or (4) other defects. When a proof tested bearing fails to comply with these specifications, all bearings in that lot shall be individually tested for acceptance.
- I. Proof test results shall be certified correct and signed by the testing laboratory personnel who conducted the test and interpreted the test results. Proof test results shall include the bearing numbers of the bearings tested.

One sample of elastomeric bearing pad, 57 ± 3 mm high and not less than 200 mm x 300 mm in plan, shall be cut by the manufacturer from one of the thickest production elastomeric bearing pads, as directed by the Engineer, and furnished to the Transportation Laboratory. The Contractor shall allow 21 days for testing and obtaining satisfactory results after the sample elastomeric bearing pad has been received.

A test specimen taken from the sample furnished to the Transportation Laboratory will be tested in conformance with the requirements in California Test 663 for 10,000 cycles at the design load and 0.5 T (T = total thickness of elastomer) translation. The testing speed shall not exceed 115 millimeters per minute. Specimens tested shall show no indication of deterioration of elastomer or loss of bond between the elastomer and steel laminates.

PTFE bearing sole plates shall be temporarily supported during concrete placement. Temporary supports shall prevent the rotation or displacement of the bearings during concrete placing operations. Temporary supports shall not inhibit the functioning of the PTFE bearings after concrete is placed. Temporary supports shall not restrict the movement at bridge joints due to temperature changes and shortening from prestress forces. Materials for temporary supports within the limits for placing concrete shall conform to the requirements for form fasteners.

PTFE and stainless steel surfaces shall be protected from contamination and weather damage.

Quantities of PTFE bearings will be determined as units from actual count in the completed work. A PTFE bearing with more than one disc shall be considered a single PTFE bearing.

The contract unit price paid for PTFE bearing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the bearing, complete in place, including temporary supports, proof testing, and cleaning and painting of PTFE bearings, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for furnishing the sample of elastomeric bearing pad shall be considered as included in the contract unit price paid for PTFE bearing, and no separate payment will be made therefor.

If a portion or all of PTFE bearings are either fabricated or tested at a site more than 480 air line kilometers from both Sacramento and Los Angeles, additional shop inspection expenses will be sustained by the State. Whereas it is and will be impractical and extremely difficult to ascertain and determine the actual increase in such expenses, it is agreed that payment to the Contractor for PTFE bearings will be reduced \$5,000 for each fabrication or testing site located more than 480 air line kilometers from both Sacramento and Los Angeles and an additional

\$10,000 (\$15,000 total) for each fabrication or testing site located more than 4800 air line kilometers from both Sacramento and Los Angeles.

10-1.66 STRUCTURE APPROACH SLABS (TYPE N)

This work shall consist of constructing reinforced concrete approach slabs, structure approach drainage system, and treated permeable base at structure approaches in conformance with the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications, and these special provisions.

GENERAL

Attention is directed to "Engineering Fabrics" of these special provisions.

STRUCTURE APPROACH DRAINAGE SYSTEM

Geocomposite Drain

Geocomposite drain shall consist of a manufactured core not less than 6.35 mm thick nor more than 50 mm thick with one or both sides covered with a layer of filter fabric that will provide a drainage void. The drain shall produce a flow rate through the drainage void of at least 25 liters per minute per meter of width at a hydraulic gradient of 1.0 and a minimum externally applied pressure of 168 kPa. A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications shall be furnished for the geocomposite drain certifying that the drain complies with these special provisions. The Certificate of Compliance shall be accompanied by a flow capability graph for the geocomposite drain showing flow rates and the externally applied pressures and hydraulic gradients. The flow capability graph shall be stamped with the verification of an independent testing laboratory.

Filter fabric for the geocomposite drain shall conform to the provisions for filter fabric for underdrains in Section 88, "Engineering Fabrics," of the Standard Specifications.

The manufactured core shall be either a preformed grid of embossed plastic, a mat of random shapes of plastic fibers, a drainage net consisting of a uniform pattern of polymeric strands forming 2 sets of continuous flow channels, or a system of plastic pillars and interconnections forming a semirigid mat.

The core material and filter fabric shall be capable of maintaining the drainage void for the entire height of geocomposite drain. Filter fabric shall be integrally bonded to the side of the core material with the drainage void. Core material manufactured from impermeable plastic sheeting having non-connecting corrugations shall be placed with the corrugations approximately perpendicular to the drainage collection system.

The geocomposite drain shall be installed with the drainage void and the filter fabric facing the embankment. The fabric facing the embankment side shall overlap a minimum of 75 mm at all joints and wrap around the exterior edges a minimum of 75 mm beyond the exterior edge. If additional fabric is needed to provide overlap at joints and wraparound at edges, the added fabric shall overlap the fabric on the geocomposite drain at least 150 mm and be attached thereto.

Should the fabric on the geocomposite drain be torn or punctured, the damaged section shall be replaced completely or repaired by placing a piece of fabric that is large enough to cover the damaged area and provide a 150 mm overlap.

Plastic Pipe

Plastic pipe shall conform to the provisions for pipe for edge drains and edge drain outlets in Section 68-3, "Edge Drains," of the Standard Specifications.

Drainage Pads

Concrete for use in drainage pads shall be minor concrete, except the concrete shall contain not less than 300 kilograms of cementitious material per cubic meter.

Treated Permeable Base At Bottom Of Geocomposite Drains

Treated permeable base to be placed around the slotted plastic pipe at the bottom of geocomposite drains shall conform to the provisions in "Treated Permeable Base Under Approach Slab." If asphalt treated permeable base is used, it shall be placed at a temperature of not less than 82°C nor more than 110°C.

The filter fabric to be placed over the treated permeable base at the bottom of geocomposite drains shall conform to the provisions for filter fabric for edge drains in Section 88, "Engineering Fabrics," of the Standard Specifications.

ENGINEERING FABRICS

Filter fabric to be placed between the structure approach embankment material and the treated permeable base shall conform to the provisions for filter fabric for edge drains in Section 88, "Engineering Fabrics," of the Standard Specifications and these special provisions.

The subgrade to receive the filter fabric, immediately prior to placing, shall conform to the compaction and elevation tolerance specified for the material involved.

Filter fabric shall be aligned, handled, and placed in a wrinkle-free manner in conformance with the manufacturer's recommendations.

Adjacent borders of the filter fabric shall be overlapped from 300 to 450 mm or stitched. The preceding roll shall overlap the following roll in the direction the material is being spread or shall be stitched. When the fabric is joined by stitching, it shall be stitched with yarn of a contrasting color. The size and composition of the yarn shall be as recommended by the fabric manufacturer. The number of stitches per 25 mm of seam shall be 5 to 7.

Equipment or vehicles shall not be operated or driven directly on the filter fabric.

TREATED PERMEABLE BASE UNDER APPROACH SLAB

Treated permeable base under structure approach slabs shall consist of constructing either an asphalt treated permeable base or a cement treated permeable base in accordance with Section 29, "Treated Permeable Bases," of the Standard Specifications and these special provisions.

The type of treatment to be used shall be at the option of the Contractor.

The Contractor shall notify the Engineer in writing, not less than 30 days prior to the start of placing the treated permeable base, which type of treated permeable base will be furnished. Once the Contractor has notified the Engineer of the selection, the type to be furnished shall not be changed without a prior written request to do so and approval thereof in writing by the Engineer.

Asphalt treated permeable base shall be placed at a temperature of not less than 93°C nor more than 121°C. Material stored in excess of 2 hours shall not be used in the work.

Asphalt treated permeable base material may be spread in one layer. The base material shall be compacted with a vibrating shoe type compactor or rolled with a roller weighing at least

1.3 tonnes but no more than 4.5 tonnes. Rolling shall begin as soon as the mixture has cooled sufficiently to support the weight of the rolling equipment without undue displacement.

Cement treated permeable base material may be spread in one layer. The base material shall be compacted with either a vibrating shoe type compactor or with a steel-drum roller weighing at least 1.3 tonnes but no more than 4.5 tonnes. Compaction shall begin within one-half hour after the spreading operation and shall consist of 2 complete coverages of the treated material.

APPROACH SLABS

Concrete for use in approach slabs shall contain not less than 400 kilograms of cementitious material per cubic meter.

Steel components of abutment ties, including plates, nuts, washers, and rods, shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

Structure approach slabs shall be cured for not less than 5 days prior to opening to public traffic, unless, at the option of the Contractor, the structure approach slabs are constructed using concrete with a nonchloride Type C chemical admixture conforming to these special provisions.

Portland cement for use in concrete using a nonchloride Type C chemical admixture shall be Type II or Type III conforming to the provisions in Section 90-2.01, "Cementitious Materials," of the Standard Specifications. Mortar containing the Type II portland cement to be used and Ottawa sand shall not contract in air more than 0.053 percent when tested in conformance with California Test 527.

The nonchloride Type C chemical admixture, approved by the Engineer, shall conform to the requirements in ASTM Designation: C 494/C 494M and Section 90-4, "Admixtures," of the Standard Specifications.

The concrete with nonchloride Type C chemical admixture shall be prequalified prior to placement in conformance with the provisions for prequalification of concrete specified by compressive strength in Section 90-9.01, "General," of the Standard Specifications and the following:

- A. Immediately after fabrication of the 5 test cylinders, the cylinders shall be stored in a temperature medium of $21^{\circ}\text{C} \pm 1.5^{\circ}\text{C}$ until the cylinders are tested.
- B. The 6-hour average strength of the 5 test cylinders shall not be less than 5.85 MPa. Not more than 2 test cylinders shall have a strength of less than 5.5 MPa.

The top surface of approach slabs shall be finished and treated in conformance with the provisions for decks in Section 51-1.17, "Finishing Bridge Decks," of the Standard Specifications. Edges of slabs shall be edger finished.

Approach slabs shall be cured with pigmented curing compound (1) in conformance with the provisions for curing structures in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications.

Structure approach slabs constructed using concrete with a nonchloride Type C chemical admixture shall be cured for not less than 6 hours prior to opening to public traffic. The curing period shall be considered to begin at the start of discharge of the last truckload of concrete to be used in the slab.

If the ambient temperature is below 18°C during the curing period for approach slabs using concrete with a nonchloride Type C chemical admixture, an insulating layer or blanket shall be used to cover the surface. The insulating layer or blanket shall have an R-value rating given in the table below. At the Contractor's option, a heating tent may be used in lieu of or in combination with the insulating layer or blanket.

Temperature Range During Curing Period	R-value, minimum
13°C to 18°C	1
7°C to 13°C	2
4°C to 7°C	3

JOINTS

Hardboard and expanded polystyrene shall conform to the provisions in Section 51-1.12D, "Sheet Packing, Preformed Pads, and Board Fillers," of the Standard Specifications.

Type AL joint seals shall conform to the provisions in Section 51-1.12F, "Sealed Joints" of the Standard Specifications. The sealant may be mixed by hand-held, power-driven agitators and placed by hand methods.

MEASUREMENT AND PAYMENT

Structural concrete, approach slab (Type N) will be measured and paid for in conformance with the provisions in Section 51-1.22, "Measurement," and Section 51-1.23, "Payment," of the Standard Specifications and these special provisions.

Full compensation for the structure approach drainage system including geocomposite drain, plastic pipe, and drainage pads, treated permeable base, filter fabric, miscellaneous metal, and waterstops shall be considered as included in the contract price paid per cubic meter for structural concrete, approach slab of the type shown in the Engineer's Estimate, and no additional compensation will be allowed therefor.

10-1.67 STRUCTURE APPROACH SLABS (TYPE R)

Structure approach slabs (Type R) consist of removing portions of existing structures, existing pavement and base including reinforced concrete approach slabs, asphalt concrete surfacing, portland cement concrete pavement, subsealing material, and cement treated base, and constructing new reinforced concrete approach slabs at structure approaches as shown on the plans and in conformance with these special provisions.

GENERAL

The thickness shown on the plans for structure approach slabs is the minimum thickness. The thickness will vary depending on the thickness of the pavement and base materials removed.

Where pavement subsealing has been performed under existing approach slabs, the full depth of subsealing material shall be removed. Where removal of cement treated base is required to construct the approach slab, the full depth of the cement treated base shall be removed.

The voids between the new structure approach slab and the base material remaining in place that are caused by removal of subsealing material or cement treated base shall be filled with either aggregate base (approach slab) or structure approach slab concrete. If the Contractor chooses to fill these voids with structure approach slab concrete, they shall be filled at the time and in the same operation that the new concrete is placed.

The Contractor shall establish a grade line for new approach slabs that will provide a smooth profile grade. The profile grade will be subject to approval by the Engineer.

At locations where the removal of existing materials and approach slab construction is not required to be completed within the same work period, the requirements in "Temporary

Roadway Structural Section" and "Trial Slab" shall not apply. The Contractor shall have the option of:

1. Constructing the approach slab in conformance with the provisions in Section 90, "Portland Cement Concrete," and curing the approach slab concrete for not less than 5 days before opening to public traffic, or
2. Constructing the approach slab using rapid strength concrete (RSC) for approach slabs in conformance with these special provisions.

TEMPORARY ROADWAY STRUCTURAL SECTION

A standby quantity of hot mix asphalt (HMA) and aggregate base equal to the quantity of pavement removed during the work shift shall be provided at the job site for construction of a temporary roadway structural section where existing approaches to structures are being replaced. The temporary structural section shall be maintained and later removed as a first order of work when the Contractor is able to construct and cure the approach slab within the prescribed time limit. The temporary structural section shall consist of a 90 mm thick layer of HMA over aggregate base.

The aggregate base for the temporary structural section shall conform to the requirements specified in "Aggregate Base (Approach Slab)" of these special provisions.

The HMA for the temporary structural section shall be produced from commercial quality aggregates and asphalt binder. The grading of the aggregate shall conform to the 19 mm maximum medium grading in Section 39-1.02E, "Aggregate," of the Standard Specifications, and the asphalt binder shall conform to the requirements of liquid asphalt SC-800 in Section 93, "Liquid Asphalts," of the Standard Specifications. The amount of asphalt binder to be mixed with the aggregate shall be approximately 0.3 percent less than the optimum bitumen content as determined by California Test 367.

Aggregate base and HMA for the temporary structural section shall be spread and compacted by methods that will produce a well-compacted, uniform base, free from pockets of coarse or fine material and a surfacing of uniform smoothness, texture, and density. The aggregate base and the HMA may each be spread and compacted in one layer. The finished surface of the HMA shall not vary more than 15 mm from the lower edge of a 3.6 m straightedge placed parallel with the centerline and shall match the elevation of the existing pavement and structure along the joints between the existing pavement and structure and the temporary surfacing.

The material from the removed temporary structural section shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications except that removed aggregate base may be stockpiled at the job site and reused for construction of another temporary structural section. When no longer required, standby material or stockpiled material for construction of temporary structural sections shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

REMOVING PORTIONS OF EXISTING STRUCTURES

Attention is directed to "Existing Highway Facilities" of these special provisions.

REMOVING EXISTING PAVEMENT AND BASE MATERIALS

The outline of portland cement concrete to be removed shall be sawed full depth with a power-driven concrete saw.

The outlines of excavations in asphalt concrete shall be cut on a neat line to a minimum depth of 75 mm with a power-driven concrete saw or wheel-type rock cutting excavator before any asphalt concrete material is removed. These excavations shall be permanently or temporarily backfilled to conform to the grade of the adjacent pavement before opening the lane to public traffic. Surplus excavated material may be used as temporary backfill material.

Regardless of the type of equipment used to remove concrete within the sawed outline, power impact tools shall not be used within 0.5 m of the pavement that is required to remain in place.

Materials removed shall be disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

The base material remaining in place after removing the existing pavement and base materials to the required depth shall be graded uniformly, watered, and compacted. The finished surface of the base material at any point shall not extend above the grade approved by the Engineer.

Areas of the base material that are low as a result of over excavation shall be filled, at the Contractor's expense, with structure approach slab concrete at the time and in the same operation that the new concrete is placed.

AGGREGATE BASE (APPROACH SLAB)

The aggregate base (approach slab) for filling voids below the reinforced structure approach slab concrete shall be produced from commercial quality aggregates consisting of broken stone, crushed gravel or natural rough-surfaced gravel, and sand, or any combination thereof. The grading of the aggregate base shall conform to the 19 mm maximum grading specified in Section 26-1.02A, "Class 2 Aggregate Base," of the Standard Specifications.

Aggregate base (approach slab) for filling voids below the reinforced structure approach slab concrete shall be spread and compacted by methods that will produce a well-compacted, uniform base, free from pockets of coarse or fine material. The aggregate base shall be watered and compacted to the grade approved by the Engineer. Where the required thickness of aggregate base is 200 mm or less, the base may be spread and compacted in one layer. Where the required thickness of aggregate base is more than 200 mm, the base shall be spread and compacted in 2 or more layers of approximately equal thickness. The maximum compacted thickness of any one layer shall not exceed 200 mm. The finished surface of the base material at any point shall not extend above the grade approved by the Engineer. Areas of the base material that are lower than the grade approved by the Engineer shall be filled with structure approach slab concrete at the time and in the same operation that the new concrete is placed.

REINFORCED CONCRETE MATERIALS

Reinforced concrete approach slabs shall conform to the provisions for approach slabs in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

The Contractor may use Type III cement in the concrete for structure approach slabs (Type R).

Concrete for use in approach slabs shall contain not less than 400 kg or more than 475 kg of cementitious material per cubic meter.

Approach slab concrete shall be constructed using rapid strength concrete (RSC). RSC approach slabs shall be constructed using either:

1. Concrete conforming to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and a nonchloride Type C chemical admixture, or

2. Concrete made with proprietary cementitious material. The concrete shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and the following:

- 2.1. In lieu of the requirements specified in Section 90-2.01, "Cementitious Materials," of the Standard Specifications, the cementitious material shall meet the definition of hydraulic cement in ASTM C 219 and the following:

Proprietary Cementitious Material

Test Description	Test Method	Requirement
Contraction in Air	California Test 527, w/c ratio = 0.39±0.010	0.053%, max.
Mortar Expansion in Water	ASTM C 1038	0.04%, max.
Soluble Chloride*	California Test 422	0.05%, max.
Soluble Sulfate*	California Test 417	0.30%, max.
Thermal Stability	California Test 553	90%, min.
Compressive Strength @ 3 days	ASTM C 109	17.2 MPa

*Test is to be done on a cube specimen fabricated in conformance with the requirements in ASTM C 109, cured at least 14 days, and then pulverized so that 100% passes the No. 50 sieve.

- 2.2. In addition to the admixtures listed on the Department's current list of approved admixtures, citric acid or borax may be used if requested in writing by the cement manufacturer and a sample is submitted to the Engineer. Chemical admixtures, if used, shall be included when testing for requirements listed in the table above.

Supplementary cementitious materials will not be required in approach slabs constructed using RSC.

RSC for approach slabs shall be prequalified before placement in conformance with the provisions for prequalification of concrete specified by compressive strength in Section 90-9.01, "General," of the Standard Specifications and the following:

1. Immediately after fabrication of the 5 test cylinders, the cylinders shall be stored in a temperature medium of 21 ± 1.5 °C until the cylinders are tested.
2. The Contractor shall determine the age of break to achieve an average strength of the 5 test cylinders of not less than 8.3 MPa. Not more than 2 test cylinders shall have a strength of less than 7.9 MPa. This age of break plus one hour will be the opening age.

Penetration requirements of Section 90-6.06, "Amount of Water and Penetration," of the Standard Specifications do not apply.

Steel components of abutment ties, including plates, nuts, washers, and rods, shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

Steel angles, plates, and bars at the concrete barrier joints shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

Building paper shall be commercial quality No. 30 asphalt felt.

PVC conduit used to encase the abutment tie rod shall be commercial quality.

Hardboard and expanded polystyrene shall conform to the provisions in Section 51-1.12D, "Sheet Packing, Preformed Pads, and Board Fillers," of the Standard Specifications.

TRIAL SLAB

Before beginning work on approach slabs constructed using RSC, the Contractor shall successfully complete one or more trial slabs for each concrete mix design to be used in

constructing the approach slabs. Trial slabs shall be constructed, finished, cured, and tested with the materials, tools, equipment, personnel, and methods to be used in completing the approach slabs. Trial slabs shall demonstrate that the Contractor is capable of producing approach slabs in conformance with the provisions in this section, within anticipated time periods including delivery, placement, finishing, and curing times, and under similar atmospheric and temperature conditions expected during construction operations. Multiple trial slabs for each approach slab concrete mix design may be required to envelop variable atmospheric conditions.

The minimum trial slab dimensions shall be 3 m x 6 m x 255 mm. Trial slabs shall be placed near the job site at a location mutually acceptable to the Engineer and the Contractor except slabs shall not be placed on the roadway or within the project limits.

Trial slab concrete shall develop compressive strengths of at least 8.3 MPa at the age of break used for prequalification of the concrete, and at least 17.2 MPa after 3 days when tested by the Contractor in conformance with the provisions in Section 90-9, "Compressive Strength, " of the Standard Specifications.

Materials resulting from construction of trial slabs and test specimens shall become the property of the Contractor and shall be removed and disposed of in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

At least 15 days before use in the trial slab, the Contractor shall submit mix designs for approach slab concrete that include the following:

1. Compressive strength test results at the age of break for prequalification of the concrete, and at 3 days, 7 days, and 28 days
2. Proposed aggregate grading
3. Mix proportions of cementitious material, aggregate, and water
4. Types and amounts of chemical admixtures, if used
5. Initial and final set time of a 300 mm x 300 mm x 140 mm concrete block curing at 21 ± 5 °C ambient temperature
6. Range of ambient temperatures over which the mix design will achieve the required minimum compressive strengths
7. Source of materials

REINFORCED CONCRETE CONSTRUCTION

At the option of the Contractor, RSC may be proportioned and placed by volumetric continuous mixers.

Weighmaster Certificates

Weighmaster certificates for RSC for approach slabs, regardless of the proportioning method used, shall include all information necessary to trace the manufacturer and manufacturer's lot number for the cement being used. When proportioned into fabric containers, the weighmaster certificates for the cement shall contain date of proportioning, location of proportioning, and actual net draft mass of the cement. When proportioned at the pour site from a storage silo, the weighmaster certificates shall contain date of proportioning, location of proportioning, and the net draft mass of the cement used in the load.

Volumetric Proportioning

When RSC for approach slabs is proportioned by volume, the method shall conform to requirements specified herein.

Liquid admixtures shall be proportioned in conformance with the provisions in Section 90-4.10, "Proportioning and Dispensing Liquid Admixtures," of the Standard Specifications, except that liquid admixtures shall be proportioned by a meter.

Supplementary cementitious materials shall be protected from exposure to moisture until used. Adequate facilities shall be provided to assure that supplementary cementitious materials meeting the specified requirements are kept separate from other supplementary cementitious materials in order to prevent any but the specified supplementary cementitious materials from entering the work. Safe and suitable facilities for sampling supplementary cementitious materials shall be provided at the batch-mixer storage hopper or in the feed line.

Batch-mixer trucks shall be equipped to proportion cement, water, aggregate, and additives by volume. Aggregate feeders shall be connected directly to the drive on the cement vane feeder. The cement feed rate shall be tied directly to the feed rate for the aggregate and other ingredients. Any change in the ratio of cement to aggregate shall be accomplished by changing the gate opening for the aggregate feed. The drive shaft of the aggregate feeder shall be equipped with a revolution counter reading to the nearest full or partial revolution of the aggregate delivery belt.

Aggregate shall be proportioned using a belt feeder operated with an adjustable cutoff gate delineated to the nearest quarter increment. Height of the gate opening shall be readily determinable. Cement shall be proportioned by a method that conforms to the accuracy requirements of these special provisions.

Delivery rate of aggregate and cement per revolution of the aggregate feeder shall be calibrated at appropriate gate settings for each batch-mixer truck used on the project and for each aggregate source. Batch-mixer trucks shall be calibrated at 3 different aggregate gate settings that are commensurate with production needs. Two or more calibration runs are required at each of the different aggregate gate openings. The actual mass of material delivered for aggregate proportioning device calibrations shall be determined by a platform scale as specified in these special provisions.

Aggregate belt feeder shall deliver aggregate to the mixer with volumetric consistency so that deviation for any individual aggregate delivery rate check-run does not exceed 1.0 percent of the mathematical average of all runs for the same gate opening and aggregate type. Each test run shall be at least 500 kg. Fine aggregate used for calibration shall not be reused for device calibration.

At the time of batching, aggregates shall be dried or drained sufficiently to result in stable moisture content, so that no visible separation of water from aggregate takes place during the proportioning process. In no event shall the free moisture content of the fine aggregate at the time of batching exceed 8 percent of its saturated, surface-dry weight.

If separate supplies of aggregate material of the same size group with different moisture content or specific gravity or surface characteristics affecting workability are available at the proportioning plant, withdrawals shall be made from one supply exclusively and the materials therein completely exhausted before starting another supply.

Rotating and reciprocating equipment on batch-mixer trucks shall be covered with metal guards.

The cement proportioning system shall deliver cement to the mixer with a volumetric consistency so that the deviation for any individual delivery rate check-run does not exceed 1.0 percent of the mathematical average of 3 runs of at least 500 kg each. Cement used for calibration shall not be reused for device calibration.

Water meter accuracy shall be such that, when operating between 50 percent and 100 percent of production capacity, the difference between the indicated mass of water delivered and the actual mass delivered does not exceed 1.5 percent of the actual mass for each of 2 individual runs

of 285 liters. The water meter shall be equipped with a resettable totalizer and display the operating rate.

Calibration tests for aggregate, cement, and water proportioning devices shall be conducted with a platform scale located at the calibration site. Weighing of test run calibration material shall be performed on a platform scale having a maximum capacity not exceeding 2.5 tonnes with maximum graduations of 0.5 kg. The platform scale shall be error tested within 8 hours of calibration of batch-mixer truck proportioning devices. Error testing shall be performed with test masses conforming to California Test 109 and shall produce a witness scale that is within 2 graduations of the test mass load. The scale shall be available for use at the production site throughout the production period. Equipment needed for the calibration of proportioning systems shall remain available at the production site throughout the production period. A Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," shall be furnished with each delivery of aggregate, cement, and admixtures used for calibration tests and shall be submitted to the Engineer with certified copies of the mass of each delivery. The Certificate of Compliance shall state that the source of materials used for the calibration tests is from the same source as to be used for the planned work. The Certificate of Compliance shall be signed by an authorized representative who shall have the authority to represent and act for the Contractor.

The batch-mixer truck shall be equipped so that an accuracy check can be made before the first operation for the project and at any other time directed by the Engineer. Further calibration of proportioning devices shall be required every 90 days after production begins or when the source or type of any ingredient is changed. A spot calibration shall consist of calibration of the cement proportioning system only. A 2-run spot re-calibration of the cement proportioning system shall be performed each time 50 tonnes of cement has passed through the batch-mixer truck. Should the spot recalibration of the cement proportioning system fall outside the limitations specified herein, a full calibration of the cement proportioning system shall be completed before the resumption of production.

Cement storage shall be located immediately before the cement feeder and shall be equipped with a device that will automatically shut down the power to the cement feeder and aggregate belt feeder when the cement storage level is lowered to a point where less than 20 percent of the total volume is left in storage.

The Contractor shall furnish aggregate moisture determinations made in conformance with the requirements of California Test 223 at least every 2 hours during proportioning and mixing operations. Moisture determinations shall be recorded and presented to the Engineer at the end of the production shift.

Each aggregate bin shall be equipped with a device that will automatically shut down the power to the cement feeder and the aggregate belt feeder when the aggregate discharge rate is less than 95 percent of the scheduled discharge rate of any bin.

Indicators specified herein shall be in working order before commencing proportioning and mixing operations and shall be visible when standing near the batch-mixer truck.

Identifying numbers of batch-mixer trucks shall be at least 75 mm in height and be located on the front and rear of the vehicles.

Volumetric proportioned RSC for approach slabs shall be mixed in a mechanically operated mixer of adequate size and power for the type of RSC to be placed. Mixers may be of the auger type and shall be operated uniformly at the mixing speed recommended by the manufacturer. Mixers that have an accumulation of hard concrete or mortar shall be removed from service until cleaned. Other types of mixers may be used provided mixing quality will meet the requirements of these special provisions.

Charge or rate of feed to the mixer shall not exceed that that will permit complete mixing of the materials. Dead areas in the mixer, where material does not move or is not sufficiently agitated, shall be corrected by a reduction in the volume of material or by other adjustments. The mixer shall be designed to provide sufficient mixing action and movement to produce properly mixed RSC. Mixing shall continue until a homogeneous mixture is produced at discharge from the mixer. There shall be no lumps or evidence of non-dispersed cement at discharge from the mixer. No water shall be added to the RSC after discharge from the mixer.

Equipment having components made of aluminum or magnesium alloys that may have contact with plastic concrete during mixing or transporting of RSC shall not be used.

Uniformity of concrete mixtures will be determined by differences in penetration measurement made in conformance with the requirements in California Test 533. Difference in penetration, determined by comparing penetration tests on 2 samples of mixed concrete from the same batch or truck mixer load, shall not exceed 15 mm. The Contractor shall furnish samples of freshly mixed concrete and provide facilities for obtaining the samples. Sampling facilities shall be safe, accessible, and clean, and shall produce a sample that is representative of production. Sample devices and sampling methods shall also conform to the requirements of California Test 125.

Ice shall not be used to cool RSC directly. When ice is used to cool water used in the mix, all of the ice shall be melted before entering the mixer.

Cement shall be proportioned and charged into the mixer by means that will result in no losses of cement due to wind or accumulation on equipment, or other conditions that will vary the required quantity of cement.

Each mixer shall have a prominently attached metal plate or plates on which the following information is provided:

1. Uses for which the equipment is designed
2. Manufacturer's guaranteed capacity of the mixer in terms of the volume of mixed concrete
3. Speed of rotation of the mixer

Consistency and workability of mixed concrete when discharged at the delivery point shall be suitable for placement and consolidation.

Information generated by volumetric devices will not be used for payment calculations.

The device that controls the proportioning of cement, aggregate, and water shall produce a log of production data. The log of production data shall consist of a series of snapshots captured at 15-minute intervals throughout the period of daily production. Each snapshot of production data shall be a register of production activity at that time and not a summation of the data over the preceding 15 minutes. The amount of material represented by each snapshot shall be the amount produced from 7.5 minutes before to 7.5 minutes after the capture time. The daily log shall be submitted to the Engineer in electronic or printed media at the end of each production shift or when requested by the Engineer and shall include the following:

1. Mass of cement per revolution count
2. Mass of each aggregate size per revolution count
3. Gate openings for each aggregate size being used
4. Mass of water added to the concrete per revolution count
5. Moisture content of each aggregate size being used
6. Individual volume of all other admixtures per revolution count
7. Time of day

8. Day of week
9. Production start and stop times
10. Batch-mixer truck identification
11. Name of supplier
12. Specific type, size, or designation of concrete being produced
13. Source of the individual aggregate sizes being used
14. Source, brand, and type of cement being used
15. Source, brand, and type of individual admixtures being used
16. Name and signature of operator

Required report items may be input by hand into a pre-printed form or captured and printed by the proportioning device. Electronic media containing recorded production data shall be presented in a tab-delimited format on a CD or a 90 mm diskette with a capacity of at least 1.4 megabytes. Each snapshot of the continuous production shall be followed by a line-feed carriage return with allowances for sufficient fields to satisfy the amount of data required by these specifications. The reported data shall be in the above order and shall include data titles at least once per report.

Construction

Bar reinforcement in drilled holes shall be bonded in conformance with the provisions for drilling and bonding dowels in Section 83-2.02D(1), "General," of the Standard Specifications.

If reinforcement is encountered during drilling before the specified depth is attained, the Engineer shall be notified. Unless the Engineer approves coring through the reinforcement, the hole will be rejected and a new hole shall be drilled adjacent to the rejected hole to the depth shown on the plans.

The top surface of approach slabs shall be finished in conformance with the provisions for decks in Section 51-1.17, "Finishing Bridge Decks," of the Standard Specifications. The finished top surface shall not vary more than 6 mm from the lower edge of a 3.6 m straightedge placed parallel with the centerline. Edges of slabs shall be edger finished. The provisions for deck crack treatment do not apply to Type R approach slabs.

The surface of the approach slab will not be profiled, and the Profile Index requirements do not apply.

Approach slab concrete shall be cured before the time the lane is to be opened to public traffic as specified in "Maintaining Traffic" of these special provisions. The curing time shall be the opening age as determined during the prequalification of the concrete.

The approach slab may be opened to traffic at the age of break as determined during the prequalification of the concrete if successful compressive strength tests are performed in the field showing the slab has achieved 8.3 MPa. The compressive strength tests shall be performed by the Contractor in conformance with the provisions for sampling and testing cylinders in Section 90-9.01, "General," of the Standard Specifications. The decision to use this option shall be made in writing to the Engineer before beginning construction on the approach slab.

Approach slabs shall be cured with pigmented curing compound (1) in conformance with the provisions for curing structures in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications. The minimum curing period as specified herein shall be considered to begin at the start of discharge of the last truckload of concrete to be used in the slab. Fogging of the surface with water after the curing compound has been applied will not be required. Should the film of curing compound be damaged from any cause before the approach slab is opened to public traffic, the damaged portion shall be repaired immediately with additional compound, at

the Contractor's expense. Damage to the curing compound after the approach slab is opened to public traffic shall not be repaired.

If the Contractor chooses the option of constructing approach slabs using RSC made with a proprietary cement, the curing method shall be as recommended by the manufacturer of the cement and as approved by the Engineer.

If the ambient temperature is below 18 °C during the curing period, an insulating layer or blanket shall cover the surface. The insulation layer or blanket shall have an R-value rating given in the table below. A heating tent may be used in lieu of or in combination with the insulating layer or blanket:

R-Value Ratings	
Temperature Range During Curing Period	R value, minimum
13 °C to 18 °C	1
7 °C to 13 °C	2
4 °C to 7 °C	3

Tests to determine the coefficient of friction of the final textured surface will be made only if the Engineer determines by visual inspection that the final texturing may not have produced a surface having the specified coefficient of friction. Tests to determine the coefficient of friction will be made after the approach slab is opened to public traffic, but not later than 5 days after concrete placement.

Type AL joint seals shall conform to the provisions in Section 51-1.12F, "Sealed Joints," of the Standard Specifications. The sealant may be mixed by hand-held power-driven agitators and placed by hand methods.

MEASUREMENT AND PAYMENT

Structural concrete, approach slab (Type R) will be measured and paid for in conformance with the provisions in Section 51-1.22, "Measurement," and Section 51-1.23, "Payment," of the Standard Specifications and these special provisions.

Full compensation for removing and disposing of portions of existing structures and pavement materials, and for furnishing and placing Type AL joint seals shall be considered as included in the contract price paid per cubic meter for structural concrete, approach slab (Type R), and no separate payment will be made therefor.

The quantity of aggregate base (approach slab) to be paid for shall include the actual volume of aggregate base (approach slab) used to fill voids below the reinforced structure approach slab concrete, except for the volume of areas low as a result of over excavation. The volume to be paid for will be calculated on the basis of the constructed length, width, and thickness of the filled voids. Structure approach slab concrete used to fill voids lower than the approved grade of the base, except for the areas low as a result of over excavation, will be measured and paid for by the cubic meter as aggregate base (approach slab).

The contract price paid per cubic meter for aggregate base (approach slab) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing aggregate base (approach slab), complete in place, including excavation and removing and disposing of base and subsealing materials, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for furnishing, stockpiling, and disposing of standby material for construction of temporary structural sections; and for constructing, maintaining, removing, and

disposing of temporary structural sections shall be considered as included in the contract price paid per cubic meter for structural concrete, approach slab (Type R), and no separate payment will be made therefor.

Full compensation for drilling and bonding of bar reinforcement shall be considered as included in the contract price paid per cubic meter for structural concrete, approach slab (Type R), and no separate payment will be made therefor.

Full compensation for constructing, testing, and removing trial slabs shall be considered as included in the contract price paid per cubic meter for structural concrete, approach slab (Type R), and no separate payment will be made therefor.

10-1.68 PAVING NOTCH EXTENSION

This work shall consist of extending existing paving notches in conformance with the details shown on the plans and these special provisions.

Concrete for paving notch extension shall be a high-strength material consisting of either magnesium phosphate concrete, modified high alumina based concrete, or portland cement based concrete. Magnesium phosphate concrete shall conform to the provisions for magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications and these special provisions. Modified high alumina based concrete and portland cement based concrete shall be water activated and shall conform to the provisions for single component (water activated) magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications and these special provisions.

At least one hour shall elapse between the time of placing concrete for the paving notch extension and placing concrete for the structure approach slab.

A clean uniform rounded aggregate filler may be used to extend the concrete. The moisture content of the aggregate shall not exceed 0.5-percent. Grading of the aggregate shall conform to the following:

Sieve Sizes	Percentage Passing
12.5-mm	100
1.18-mm	0-5

The amount of aggregate filler shall conform to the manufacturer's recommendation, but in no case shall the concrete strengths be less than that specified for magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications.

The components of dual component (with a prepackaged liquid activator) magnesium phosphate shall be combined by mixing complete units supplied by the manufacturer. Portions of units shall not be used. Water shall not be added to dual component magnesium phosphate.

Magnesium phosphate concrete shall not be mixed in containers or worked with tools containing zinc, cadmium, aluminum or copper. Modified high alumina based concrete shall not be mixed in containers or worked with tools containing aluminum.

Concrete shall not be retempered. Finishing tools that are cleaned with water shall be thoroughly dried before working the concrete.

When placing concrete on slopes exceeding 5 percent, the Engineer may require the Contractor to provide a flow controlled modified material.

Modified high alumina based concrete and portland cement based concrete shall be cured in conformance with the provisions in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications. Magnesium phosphate concrete shall not be cured.

The surface temperature of the areas to receive the concrete shall be 5°C or above when the concrete is placed. The contact surface to receive the magnesium phosphate concrete shall be dry. The contact surfaces to receive the modified high alumina concrete or portland cement based concrete may be damp but not saturated.

The construction joint between the paving notch extension and the existing abutment shall conform to the provisions for horizontal construction joints in Section 51-1.13, "Bonding," of the Standard Specifications. Concrete shall be placed in the spalled portions of the existing paving notch concurrently with the concrete for the paving notch extension.

Attention is directed to "Reinforcement" of these special provisions.

Structure excavation and backfill shall conform to the provisions in Section 19-3, "Structure Excavation and Backfill," of the Standard Specifications, except for payment.

Drilling of holes and bonding of reinforcing steel dowels shall conform to the provisions for drilling and bonding dowels in Section 83-2.02D(1), "General," of the Standard Specifications. If reinforcement is encountered during drilling before the specified depth is attained, the Engineer shall be notified. Unless the Engineer approves coring through the reinforcement, the hole will be rejected and a new hole, in which reinforcement is not encountered, shall be drilled adjacent to the rejected hole to the depth shown on the plans.

The quantity of concrete for paving notch extension will be measured by the cubic meter as determined in conformance with the dimensions shown on the plans or other dimensions that may be ordered in writing by the Engineer.

The contract price paid per cubic meter for paving notch extension shall include full compensation for furnishing all labor, materials (including concrete for the paving notch spalled areas), tools, equipment, and incidentals, and for doing all the work involved in constructing the paving notch extension, complete in place, including structure excavation and backfill, reinforcement, and drilling and bonding dowels, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.69 SOUND WALL

DESCRIPTION

This work shall consist of constructing sound walls of masonry block. Sound walls shall be supported on concrete barriers, retaining walls, and pile caps as shown on the plans.

SOUND WALL (MASONRY BLOCK)

Sound wall (masonry block), consisting of a reinforced hollow unit masonry block stem, shall be constructed in conformance with the provisions in Section 19, "Earthwork," Section 52, "Reinforcement," and Section 90, "Portland Cement Concrete," of the Standard Specifications and these special provisions.

Sound wall masonry unit stems shall be constructed with joints of mortar. Wall stems shall be constructed with hand laid block. Wall stems shall not be constructed with preassembled panels.

The angle of internal friction (ϕ) to be used with Standard Plan drawings for the soils at sound wall 1, 2, 126A, 126C 242A is 30.

Concrete masonry units shall be hollow, load bearing, lightweight or medium weight class units conforming to the requirements in ASTM Designation: C 90. Standard or open-end units may be used. Open-end units, if used, shall not reduce the spacing of the bar reinforcement as shown on the plans.

The masonry units shall be nominal size and texture and of uniform color. The color shall be #30450, selected from the manufacturer's standards.

When high strength concrete masonry units with $f'm=17.24$ MPa are shown on the plans, the high strength masonry units shall have a minimum compressive strength of 25.86 MPa based on net area. When high strength concrete masonry units with $f'm=13.79$ MPa are shown on the plans, the high strength masonry units shall have a minimum compressive strength of 19.31 MPa based on net area. Each high strength concrete masonry unit shall be identified with a groove embedded in an interior corner. The groove shall extend from a mortar surface for a length of about 50 mm and shall have a depth of about 5 mm. When regular strength concrete masonry units with $f'm=10.34$ MPa are shown on the plans, the regular strength masonry units shall have a minimum compressive strength of 13.1 MPa based on net area.

Expansion joint filler shall conform to the requirements in ASTM Designation: D 1751 or ASTM Designation: D 2000 M2AA 805.

Mortar shall be colored to match the units. Coloring shall be chemically inert, fade resistant mineral oxide or synthetic type.

Cementitious material for wall stems shall conform to the provisions in Section 90-2.01, "Cementitious Materials," of the Standard Specifications.

Hydrated lime shall conform to the requirements in ASTM Designation: C 207, Type S.

Mortar sand shall be commercial quality.

Mortar for laying masonry units shall consist, by volume, of one part cementitious material, zero to 0.5 part hydrated lime, and 2.25 to 3 parts mortar sand. Sufficient water shall be added to make a workable mortar. Each batch of mortar shall be accurately measured and thoroughly mixed. Mortar shall be freshly mixed as required. Mortar shall not be retempered more than one hour after mixing.

Prepackaged mortar materials and mortar containing admixtures may be used when approved in writing by the Engineer, provided the mortar shall not contain more than 0.05 percent soluble chlorides when tested in conformance with California Test 422 or more than 0.25 percent soluble sulfates, as SO_4 , when tested in conformance with California Test 417.

Before laying masonry units using prepackaged mortar materials or mortar containing admixtures, the Contractor shall submit to the Engineer the proposed sources of the materials together with test data from an independent testing laboratory for mortar tested in conformance with California Test 551. The test data shall be from specimens having a moist cure, except that the sample shall not be immersed in lime water. The average 28-day compressive strength of the mortar shall be not less than 17.2 MPa.

Aggregate for grout used to fill masonry units shall consist of fine aggregate and coarse aggregate conforming to the provisions in Section 90-2.02, "Aggregates," of the Standard Specifications. At least 20 percent of the aggregate shall be coarse aggregate. The Contractor shall determine the grading except that 100 percent of the combined grading shall pass the 12.5 mm sieve.

At the option of the Contractor, grout for filling masonry units may be proportioned either by volume or mass. Grout shall contain only enough water to cause the grout to flow and fill the voids without segregation. The maximum amount of free water shall not exceed 0.7 times the weight of the cementitious material for regular strength masonry. The maximum amount of free water shall not exceed 0.6 times the mass of the cementitious material for high strength masonry.

Grout proportioned by volume for regular strength masonry shall consist of at least one part cementitious material and 4.5 parts aggregate. Grout proportioned by volume for high strength masonry shall consist of at least one part cementitious material and 3.5 parts aggregate. Aggregate volumes shall be based on a loose, air-dry condition.

Grout proportioned by mass for regular strength masonry shall contain not less than 325 kilograms of cementitious material per cubic meter. Grout proportioned by mass for high strength masonry shall contain not less than 400 kilograms of cementitious material per cubic meter.

Reinforced concrete masonry unit wall stems shall be constructed with mortar joints in conformance with the following:

- A. Concrete masonry unit construction shall be true and plumb in the lateral direction and shall conform to the grade shown on the plans in the longitudinal direction. Bond beam units or recesses for horizontal reinforcement shall be provided.
- B. Mortar joints shall be approximately 10 mm wide. Walls and cross webs forming cells to be filled with grout shall be full bedded in mortar to prevent leakage of grout. All head and bed joints shall be solidly filled with mortar for a distance in from the face of the wall or unit not less than the thickness of the longitudinal face shells. Head joints shall be shoved tight.
- C. Mortared joints around cells to be filled shall be placed so as to preserve the unobstructed vertical continuity of the grout filling. Any overhanging mortar or other obstruction or debris shall be removed from the inside of such cells.
- D. Reinforcement shall be securely held in position at top and bottom with either wire ties or spacing devices and at intervals not exceeding 192 bar diameters before placing any grout. Wire shall be 16 gage(1.57 mm) or heavier. Wooden, aluminum, or plastic spacing devices shall not be used.
- E. Splices in vertical reinforcement shall be made only at the locations shown on the plans.
- F. Only those cells containing reinforcement shall be filled solidly with grout. All grout in the cells shall be consolidated at the time of placement by vibrating and reconsolidated after excess moisture has been absorbed but before plasticity is lost. Grout shall not be sliced with a trowel.
- G. Walls shall be constructed in 1.2 m maximum height lifts. Grouting of each lift shall be completed before beginning masonry unit construction for the next lift. The top course of each lift shall consist of a bond beam.
- H. A construction joint shall be constructed at the top of the top course to permit placement of the mortar cap. The mix design for the mortar cap shall be as approved by the Engineer.
- I. Construction joints shall be made when the placing of grout, in grout filled cells, is stopped for more than one hour. The construction joint shall be approximately 12 mm below the top of the last course filled with grout.
- J. Bond beams shall be continuous. The top of unfilled cells under horizontal bond beams shall be covered with metal or plastic lath.
- K. When fresh masonry joins masonry that is partially or totally set, the contact surface shall be cleaned, roughened, and lightly wetted.
- L. Surfaces of concrete on which the masonry walls are to be constructed shall be roughened and cleaned, exposing the aggregate, and shall be flushed with water and allowed to dry to a surface dry condition immediately before laying the masonry units.
- M. Where cutting of masonry units is necessary, all cuts shall be made with a masonry saw to neat and true lines. Masonry units with cracking or chipping of the finished exposed surfaces will not be acceptable.
- N. Masonry shall be protected in the same manner specified for concrete structures in Section 90-8, "Protecting Concrete," of the Standard Specifications and these special provisions.

- O. During erection, all cells shall be kept dry in inclement weather by covering partially completed walls. The covering shall be waterproof fabric, plastic or paper sheeting, or other approved material. Wooden boards and planks shall not be used as covering materials. The covering shall extend down each side of masonry walls approximately 0.6 m.
- P. Splashes, stains, or spots on the exposed faces of the wall shall be removed.

MEASUREMENT AND PAYMENT

Sound walls of the types designated in the Engineer's Estimate will be measured by the square meter of the area of wall projected on a vertical plane between the elevation lines shown on the plans and length of wall (including the exposed posts, back up wall for access openings, and access gates).

The contract price paid per square meter for sound wall of the types designated in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the sound wall, complete in place, including all anchorages and reinforcement, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer. Sound wall supports will be measured and paid for as separate items of work.

Sound wall footings, pile caps, and grade beams will be measured and paid for as minor concrete (sound wall).

The contract price paid per cubic meter for minor concrete (sound wall) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in constructing the footings, pile caps, and grade beams, complete in place, including excavation, backfill, and reinforcement, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.70 DRILL AND BOND DOWELS

Drilling and bonding dowels shall conform to the details shown on the plans, the provisions in Section 83-2.02D(1), "General," of the Standard Specifications, and these special provisions.

Dowels shall conform to the provisions for bar reinforcement in "Reinforcement" of these special provisions.

If reinforcement is encountered during drilling before the specified depth is attained, the Engineer shall be notified. Unless the Engineer approves coring through the reinforcement, the hole will be rejected and a new hole, in which reinforcement is not encountered, shall be drilled adjacent to the rejected hole to the depth shown on the plans.

Unless otherwise provided, dowels to be bonded into drilled holes will be paid for as bar reinforcing steel (bridge).

Unless otherwise provided, drilling and bonding dowels will be measured and paid for by the meter determined by the number and the required depth of holes as shown on the plans or as ordered by the Engineer.

The contract price paid per meter for drill and bond dowel shall include full compensation for furnishing all labor, materials (except reinforcing steel dowels), tools, equipment, and incidentals, and for doing all the work involved in drilling the holes, including coring through reinforcement when approved by the Engineer, and bonding the dowels, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.71 SEALING JOINTS

Joints in concrete bridge decks and joints between concrete structures and concrete approach slabs must be sealed in conformance with the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications, and these special provisions.

When ordered by the Engineer, a joint seal larger than called for by the Movement Rating shown on the plans must be furnished and installed. Payment to the Contractor for furnishing the larger seal and for saw cutting the increment of additional depth of groove required will be determined as provided in Section 4-1.03, "Changes," of the Standard Specifications.

10-1.72 JOINT SEAL ASSEMBLIES (MAXIMUM MOVEMENT RATING, 100 mm)

Joint seal assemblies shall conform to the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications, and these special provisions.

All metal parts of the joint seal assembly shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications. Bolts, nuts, and washers shall conform to the requirements in ASTM Designation: A 325 or A 325M.

At the Contractor's option, cleaning and painting of all new metal surfaces of the joint seal assembly, except stainless steel and anchorages embedded in concrete, may be substituted for galvanizing. Cleaning and painting shall be in conformance with the provisions in "Clean and Paint Joint Seal Assemblies and PTFE Bearings" of these special provisions.

Certification in conformance with the requirements in SSPC-QP 1, SSPC-QP 2, and SSPC-QP 3 of the "SSPC: The Society for Protective Coatings" will not be required for cleaning and painting joint seal assemblies.

Finish coats will not be required on joint seal assemblies.

Sheet neoprene shall conform to the provisions for neoprene in Section 51-1.14, "Waterstops," of the Standard Specifications. The sheet neoprene shall be fabricated to fit the joint seal assembly accurately.

Metal parts of the joint seal assembly shall be pre-assembled before installation to verify the geometry of the completed seal.

The bridge deck surface shall conform to the provisions in Section 51-1.17, "Finishing Bridge Decks," of the Standard Specifications prior to placing and anchoring the joint seal assembly.

The assembly shall be placed in a blocked out recess in the concrete deck surface. The depth and width of the recess shall permit the installation of the assembly anchorage components or anchorage bearing surface to the lines and grades shown on the plans.

Sheet neoprene shall be installed at such time and in such manner that the sheet neoprene will not be damaged by construction operations. The joint shall be cleaned of all dirt, debris and other foreign material immediately prior to installation of the sheet neoprene.

ALTERNATIVE JOINT SEAL ASSEMBLY

At the Contractor's option, an alternative joint seal assembly may be furnished and installed provided: (1) that the quality of the alternative and its suitability for the intended application are at least equal to that of the joint seal assembly shown on the plans, (2) that acceptable working drawings and a Certificate of Compliance are furnished as specified herein and (3) that the alternative conforms to the following requirements:

- A. The determination as to the quality and suitability of a joint seal assembly will be made in the same manner as provided in Section 6-1.05, "Trade Names and Alternatives," of the Standard Specifications. The factors to be considered will include: the ability of the assembly to resist the intrusion of foreign material and water throughout the full range of movement for the application, and the ability to function without distress to any component.
- B. Joint seal assemblies will not be considered for approval unless it can be proven that the assembly has had at least one year of satisfactory service under conditions similar to this application.
- C. The Contractor shall submit complete working drawings for each joint seal assembly to the Division of Structure Design (DSD) in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The working drawings shall show complete details of the joint seal assembly and anchorage components and the method of installation to be followed, including concrete blockout details and additions or rearrangements of the reinforcing steel from that shown on the plans. For initial review, 5 sets of working drawings shall be submitted. After review, between 6 and 12 sets of working drawings, as requested by the Engineer, shall be submitted to DSD for final approval and use during construction.
- D. The working drawings shall be supplemented with calculations for each proposed joint seal assembly, as requested by the Engineer. Working drawings shall be either 279 mm x 432 mm or 559 mm x 864 mm in size. Each drawing and calculation sheet shall include the State assigned designations for the contract number, bridge number, full name of the structure as shown on the contract plans, and District-County-Route-Kilometer Post. The design firm's name, address, and telephone number shall be shown on the working drawings. Each sheet shall be numbered in the lower right hand corner and shall contain a blank space in the upper right hand corner for future contract sheet numbers.
- E. Calculations, when requested, and working drawings, shall be stamped and signed by an engineer who is registered as a Civil Engineer. The Contractor shall allow the Engineer 4 weeks to review the drawings after a complete set has been received.
- F. Within 3 weeks after final working drawing approval, one set of the corrected good quality prints on 75 g/m² (minimum) bond paper (559 mm x 864 mm in size) of all working drawings prepared by the Contractor for each joint seal assembly shall be furnished to DSD.
- G. Each shipment of joint seal materials shall be accompanied by a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The certificate shall state that the materials and fabrication involved comply in all respects to the specifications and data submitted in obtaining the approval.
- H. The elastomer portion of the joint seal assembly shall be neoprene conforming to the requirements in Table 1 of ASTM Designation: D 2628 and the following, except that no recovery tests or compression-deflection tests will be required:

PROPERTY	TEST METHOD	REQUIREMENT
Hardness, Type A Durometer, points	ASTM D 2240 (Modified)	55-70
Compression set, 70 hours at 100°C, maximum, percent	ASTM D 395 (Modified)	40

- I. All metal parts of an alternative joint seal assembly shall conform to the requirements above for the joint seal assembly shown on the plans. At the Contractor's option, metal parts may conform to the requirements in ASTM Designation: A 572/A 572M.
- J. The assembly and its components shall be designed to support the AASHTO HS20-44 loading with 100 percent impact. The tire contact area used to distribute the tire loads shall be 244 mm, measured normal to the longitudinal axis of the assembly, by 508 mm wide. The assembly shall provide a smooth riding joint without slapping of components or wheel tire rumble.
- K. The Movement Rating of the assembly shall be measured normal to the longitudinal axis of the assembly. The dimensions for positioning the assembly within the Movement Rating during installation shall be measured normal to the longitudinal axis, disregarding any skew of the deck expansion joint.
- L. The assembly shall have cast-in-place anchorage components forming a mechanical connection between the joint components and the concrete deck.
- M. The maximum depth and width of the recess shall be such that the primary reinforcement to provide the necessary strength of the structural members is outside the recess. The maximum depth of the recess at abutments and at hinges shall be 250 mm. The maximum width of the recess on each side of the expansion joint shall be 300 mm.
- N. All reinforcement other than the primary reinforcement shall continue through the recess construction joint into the recess and engage the anchorage components of the assembly.
- O. Horizontal angle points and vertical corners at curbs in assemblies shall consist of either pre-molded sections or standard sections of the joint seal assembly that have been specially miter cut or bent to fit the structure.
- P. The elastomer portion of the assembly shall be installed in conformance with the manufacturer's recommendations at such time and in such a manner that the elastomer portion will not be damaged by construction operations. The joint and blockout shall be cleaned of all dirt, debris, and other foreign material immediately prior to the installation of the elastomer.

Full compensation for additional materials or work required because of the application of the optional cleaning and painting or the use of an alternative type joint seal assembly, shall be considered as included in the contract price paid per meter for the joint seal assembly involved and no additional compensation will be allowed therefor.

10-1.73 JOINT SEAL ASSEMBLIES (MOVEMENT RATING EXCEEDING 100 mm)

Joint seal assemblies with movement ratings greater than 100 mm shall consist of a metal frame system, supporting rails and support bars with intervening neoprene glands and shall conform to the details shown on the plans, the provisions in Section 51, "Concrete Structures," of the Standard Specifications, and to these special provisions.

Joint seal assemblies will not be considered for approval without satisfactory evidence that the assemblies have had at least one year of satisfactory service under conditions similar to this application.

A qualified representative of the manufacturer shall be present during installation of the first assembly and shall be available for advice during any remaining installations.

The Contractor shall submit complete working drawings for each joint seal assembly to the Offices of Structure Design (OSD) in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The working drawings shall show

complete details of the joint seal assembly and anchorage components and the method of installation to be followed, including concrete blockout details and any additions or rearrangements of the reinforcing steel from that shown on the plans. For initial review, 5 sets of drawings shall be submitted. After review, between 6 and 12 sets, as requested by the Engineer, shall be submitted to DSD for final approval and use during construction.

The working drawings shall be supplemented with complete calculations for the particular joint seal assembly, when requested by the Engineer. Working drawings shall be either 279 mm x 432 mm in size and each drawing and calculation sheet shall include the State assigned designations for the contract number, bridge number, full name of the structure as shown on the contract plans, and District-County-Route-Kilometer Post. The design firm's name, address, and phone number shall be shown on the working drawings. Each sheet shall be numbered in the lower right hand corner and shall contain a blank space in the upper right hand corner for future contract sheet numbers.

Calculations, when requested, and working drawings shall be stamped and signed by an engineer who is registered as a Civil Engineer. The Contractor shall allow the Engineer 28 days to review the drawings after a complete set has been received.

Within 21 days after final working drawing approval, one set of corrected 559 mm x 864 mm prints on 75-g/m² (minimum) bond paper of all working drawings prepared by the Contractor for each joint seal assembly shall be furnished to the Engineer.

Each shipment of joint seal assembly materials shall be accompanied by a Certificate of Compliance in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The certificate shall state that the materials and fabrication involved comply in all respects to the specifications and data submitted in obtaining approval.

The neoprene glands shall conform to the requirements in Table 1 of ASTM Designation: D 2628 and the following, except that no recovery tests or compression-deflection tests will be required:

Property	Requirement	ASTM Test Method
Hardness, Type A Durometer, points	55-70	D 2240 (Modified)
Compression set, 70 hours at 100°C maximum, percent	40	D 395 Method B (Modified)

All metal parts of the joint seal assembly shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications. Bolts, nuts and washers shall conform to the provisions for high-strength steel fastener assemblies in Section 75-1.02, "Miscellaneous Iron and Steel," of the Standard Specifications. At the Contractor's option, metal parts may conform to the requirements of ASTM Designation: A 572/A 572M.

At the Contractor's option, cleaning and painting of all new metal surfaces of the joint seal assembly, except stainless steel and anchorages embedded in concrete, may be substituted for galvanizing. Cleaning and painting shall be in conformance with the provisions in "Clean and Paint Joint Seal Assemblies and PTFE Bearings" of these special provisions.

If the assembly consists of more than one component, the design of the assembly shall be such that the external components can be removed and reinstalled at any position, within the larger one-half of the movement rating shown on the plans, to permit the inspection of the internal components of the assembly.

Except for components in contact with the tires, the assembly and its components shall be designed to support the AASHTO HS20-44 loading with 100 percent impact. Each component

in contact with the tires shall support a minimum of 80 percent of the AASHTO HS20-44 loading with 100 percent impact. The tire contact area used to distribute the tire loads shall be 244 mm, measured normal to the longitudinal axis of the assembly, by 508 mm wide. The assembly shall provide a smooth riding joint without slapping of components or wheel tire rumble.

The movement rating of the assembly shall be measured normal to the longitudinal axis of the assembly. The dimensions for positioning the assembly within the movement rating during installation shall be measured normal to the longitudinal axis, disregarding any skew of the deck expansion joint. The assembly shall be capable of adjustment to the "a" dimension shown on the plans.

The maximum width of unsupported or yielding components or grooves in the roadway surface of the assembly, measured in the direction of vehicular traffic, shall be 75 mm.

The assembly shall have cast-in-place anchorage components forming a mechanical connection between the joint components and the concrete deck.

The bridge deck surface shall conform to the provisions in Section 51-1.17 "Finishing Bridge Deck," of the Standard Specifications prior to placing joint seal assemblies and anchorage.

The assembly shall be completely shop-assembled and placed in a blocked out recess in the concrete deck surface. The depth and width of the recess shall permit the installation of the assembly anchorage components or anchorage bearing surface to the planned line and grade.

The maximum depth and width of the recess shall be such that the primary reinforcement to provide the necessary strength of the structural members is outside the recess. The maximum depth of the recess at abutments and at hinges shall be 300 mm. The maximum width of recess on each side of the expansion joint shall be 450 mm.

All reinforcement other than primary reinforcement shall continue through the recess construction joint into the recess and engage the anchorage components of the assembly.

The vertical expansion joint in barrier shall be available for inspection after placement of the recess concrete around the anchorage components of the assembly.

The assembly shall make a watertight, continuous return 150 mm up into the barrier at the low side of the deck joint. Neoprene glands shall be continuous without field splices or joints, including the return up into the barrier.

Full compensation for any additional materials or work required because of application of the optional cleaning and painting shall be considered as included in the contract price paid per linear meter for the joint seal assembly involved, and no additional compensation will be allowed therefor.

10-1.74 REFINISHING BRIDGE DECKS

Surfaces of bridge decks and approach slabs that are exposed when existing railings, curbs, or sidewalks are removed shall be prepared and refinished flush with the adjoining deck surface with portland cement concrete or rapid setting concrete, at the option of the Contractor, in conformance with these special provisions.

The exact area to be refinished will be designated by the Engineer.

Attention is directed to "Public Safety" of these special provisions.

When work is being performed within 3 m of a traffic lane or performed over traffic, dust and residue from deck preparation and cleaning shall be removed or controlled by vacuum, water spray, or shield methods approved by the Engineer.

Concrete shall be removed without damage to concrete that is to remain in place. Damage to concrete that is to remain in place shall be repaired to a condition satisfactory to the Engineer.

The concrete in deck areas to be refinished shall be removed to a depth of approximately 20 mm below the adjoining deck surface. A 20 mm deep saw cut shall be made along the perimeter of areas prior to removing the concrete.

Existing areas of the deck more than 20 mm below the adjoining deck surface shall be prepared by removing not less than 6 mm of surface material to expose sound aggregate.

Concrete removal may be done by abrasive blast cutting, abrasive sawing, impact tool cutting, machine rotary abrading, or by other methods, all to be approved by the Engineer. Cut areas shall be cleaned free of dust and all other loose and deleterious materials by brooming, abrasive blast cleaning, and high pressure air jets. Equipment shall be fitted with suitable traps, filters, drip pans, or other devices to prevent oil or other deleterious matter from being deposited on the deck.

Existing reinforcement, exposed during the removal of concrete, that is to remain in place shall be protected from damage.

Steel dowels shall be cut off flush with the existing concrete or cut off at the bottom of concrete removal, whichever is lower. Patching around or over dowels in sound concrete will not be required. Existing voids around dowels, where refinishing is not required, shall be chipped back to sound concrete, the dowels shall be removed 25 mm below the finished surface, and the hole shall be filled with rapid setting concrete.

Refinishing isolated high areas in the existing deck may be accomplished by cutting the concrete down to be flush with the plane of the adjoining deck surface by abrasive sawing, grinding, impact tool cutting, or by other methods to be approved by the Engineer. When grinding is performed to bring the deck concrete flush with the adjoining deck surface, the resulting surface shall have a coefficient of friction of not less than 0.35 as determined by California Test 342.

PORTLAND CEMENT CONCRETE

An epoxy adhesive shall be applied to the surfaces to be refinished before placing the portland cement concrete. Immediately prior to applying the adhesive, the area to receive the adhesive shall be cleaned by abrasive blasting and blown clean by compressed air to remove dust and any other loose material. The area to be covered shall be surface dry and the ambient temperature shall be 10°C or above when the adhesive is applied.

The epoxy adhesive shall be furnished and applied in conformance with the provisions in Section 95-1, "General," and Section 95-2.03, "Epoxy Resin Adhesive for Bonding New Concrete to Old Concrete," of the Standard Specifications. The exact rate of applying epoxy adhesive will be as determined by the Engineer. The adhesive shall be worked onto the surface with stiff brushes or equal.

Portland cement concrete used to fill the prepared areas shall conform to the provisions in Section 90, "Portland Cement Concrete," of the Standard Specifications and the following:

- A. The concrete shall contain a minimum of 400 kilograms of cementitious material per cubic meter.
- B. The amount of free water used in concrete shall not exceed 166 kg/m³.
- C. The aggregate shall contain between 50 and 55 percent fine aggregate and the remainder shall be pea gravel. The grading of pea gravel shall be such that 100 percent passes the 12.5 mm screen and not more than 5 percent passes the 1.18 mm sieve, unless a larger size is ordered by the Engineer.
- D. Admixtures shall be furnished and used if directed by the Engineer.

- E. Immediately after depositing on the newly placed adhesive, the portland cement concrete shall be thoroughly consolidated until all voids are filled and free mortar appears on the surface and then struck off to the required grade.
- F. Concrete shall be cured as provided in Section 90-7.03, "Curing Structures," of the Standard Specifications.
- G. No loads of any kind shall be applied to the portland cement concrete for at least 7 days after placing, unless otherwise permitted by the Engineer.

RAPID SETTING CONCRETE

The concrete used to fill the prepared areas shall be a high-strength material consisting of either magnesium phosphate concrete, modified high alumina based concrete, or portland cement based concrete. Magnesium phosphate concrete shall conform to the requirements for magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications and these special provisions. Modified high alumina based concrete and portland cement based concrete shall be water activated and shall conform to the requirements for single component (water activated) magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications and the following:

- A. A clean uniform rounded aggregate filler may be used to extend the concrete. The moisture content of the aggregate shall not exceed 0.5 percent. Grading of the aggregate shall conform to the following:

Sieve Size	Percentage Passing
12.5 mm	100
1.18 mm	0-5

- B. The amount of aggregate filler shall conform to the manufacturer's recommendation, but in no case shall the concrete strengths be less than that specified for magnesium phosphate concrete in Section 83-2.02D(1), "General," of the Standard Specifications.
- C. Mixing of components of dual component (with a prepackaged liquid activator) magnesium phosphate shall be by complete units, supplied by the manufacturer. Portions of units shall not be used. Water shall not be added to dual component magnesium phosphate.
- D. Immediately prior to applying the rapid setting concrete, the surface shall be dry and blown clean by compressed air to remove accumulated dust and any other loose material. If the surface becomes contaminated at any time prior to placing the concrete, the surface shall be cleaned by abrasive blasting. The surface temperature of the areas to be covered shall be 4°C or above when the concrete is applied. Methods proposed to heat said surfaces are subject to approval by the Engineer. The surface for the magnesium phosphate concrete shall be dry. The surfaces for modified high alumina based concrete or portland cement based concrete may be damp but not saturated.
- E. Magnesium phosphate concrete shall not be mixed in containers or worked with tools containing zinc, cadmium, aluminum, or copper. Modified high alumina based concrete shall not be mixed in containers or worked with tools containing aluminum.
- F. Concrete shall not be retempered. Finishing tools that are cleaned with water shall be thoroughly dried before working the concrete.
- G. When placing concrete on slopes exceeding 5 percent, the Engineer may require the Contractor to provide a flow controlled modified material.

- H. Modified high alumina based concrete and portland cement based concrete shall be cured in conformance with the provisions in Section 90-7.01B, "Curing Compound Method," of the Standard Specifications. Magnesium phosphate concrete shall not be cured.
- I. Unless otherwise permitted in writing by the Engineer, public traffic shall not be permitted on the new concrete until at least 24 hours after final set.

FINISHING REQUIREMENTS

In advance of the curing operations, the surface of the concrete shall be textured by brooming with a stiff bristled broom or by other suitable devices that will result in uniform scoring. Brooming shall be performed transversely. The operation shall be performed at a time and in a manner that produces a hardened surface having a uniform texture and a coefficient of friction of not less than 0.35 as determined by California Test 342.

Refinished surfaces that are found to have a coefficient of friction less than 0.35 shall be ground or grooved by the Contractor at his expense in conformance with the applicable provisions in Section 42, "Groove and Grind Pavement," of the Standard Specifications.

In the longitudinal direction, refinished surfaces shall not vary more than 6 mm from the lower edge of a 3.6 m straightedge. The refinished surface shall be flush with the existing adjoining surface.

MEASUREMENT AND PAYMENT

No adjustment of compensation will be made for any increase or decrease in the quantity of refinish bridge deck, regardless of the reason for the increase or decrease. The provisions in Section 4-1.03B, "Increased or Decreased Quantities," of the Standard Specifications shall not apply to the contract item of refinish bridge deck.

The quantity in square meters of refinish bridge deck to be paid for will be determined from the lengths and widths of the refinished areas, measured horizontally, plus 0.02 m² for patching around each dowel.

The contract price paid per square meter for refinish bridge deck shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in refinishing areas of the existing bridge deck (including cutting steel dowels), complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.75 ARCHITECTURAL TREATMENT

Architectural treatment for concrete surfaces shall conform to the details shown on the plans and the provisions in Section 51, "Concrete Structures," of the Standard Specifications and these special provisions.

Architectural treatments listed below are required at concrete surfaces shown on the plans:

- A. Fractured rib texture
- B. Slate texture
- C. Smooth texture
- D. Sandblast texture
- E. Exposed aggregate texture
- F. Arrowhead cluster pattern texture
- G. Mountain pattern texture
- H. Railroad mural texture

The fractured rib texture shall be an architectural texture simulating the appearance of straight ribs of concrete with a fractured concrete texture imparted to the raised surface between the ribs. Grooves between ribs shall be continuous with no apparent curves or discontinuities. Variation of the groove from straightness shall not exceed 6 mm for each 3 m of groove. The architectural texture shall have random shadow patterns. Broken concrete at adjoining ribs and groups of ribs shall have a random pattern. The architectural texture shall not have secondary patterns imparted by shadows or repetitive fractured surfaces.

The slate texture for the mountain pattern texture shall be an architectural texture simulating the appearance of split slate with a maximum texture relief as indicated on the plans. Formliner joints shall be constructed to maintain continuity in the slate texture pattern across the joint.

The sandblast texture for the mountain pattern texture shall be an architectural texture simulating the appearance of a sandblasted surface with a maximum texture relief as indicated on the plans.

The exposed aggregate texture for the railroad mural texture shall be an architectural texture simulating the appearance of an exposed aggregate surface with a maximum texture relief as indicated on the plans. Formliner joints shall be constructed to maintain continuity in the exposed aggregate texture pattern across the joint.

The smooth texture shall be a Class 1 surface finish.

The arrowhead cluster texture, mountain pattern texture, and railroad mural texture shall simulate a formed relief constructed to the dimensions and shapes shown on the plans. Corners at the intersection of plane surfaces shall be sharp and crisp without easing or rounding. A Class 1 surface finish shall be applied to the smooth texture on mountain pattern texture.

REFEREE SAMPLE

The fractured rib, slate, sandblast and exposed aggregate architectural textures shall match the respective textures, and pattern of the respective referee samples available for inspection by bidders at the District 8 Landscape Architecture Unit Office of, 464 West Fourth Street, 10th Floor, San Bernardino, California.

WORKING DRAWINGS

Prior to constructing any architectural treatment, the Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 3 copies of working drawings. Separate working drawings shall be submitted for each facility requiring architectural treatment. As a minimum, each working drawing shall include the following:

- A. Placement of all joint lines, including but not limited to: expansion joints, weakened plane joints and joints between formliner units.
- B. An electronic copy shall be submitted in ".dgn" format.

The Engineer shall have 15 days to review and approve the architectural treatment submittal after a complete plan has been received. No construction of architectural treatment test panels shall be performed until the architectural working drawings are approved by the Engineer. Should the Engineer fail to complete the review within this time allowance, and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in approving the architectural treatment working drawings, the delay will be considered a right of way delay in conformance with the specifications in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

TEST PANEL

A test panel at least 4 m x 4 m in size shall be successfully completed and approved by the Engineer before beginning work on any architectural textures for each type of architectural treatment. The architectural texture test panels shall depict the relief pattern as shown on the plans or as directed by the Engineer. Each test panel shall be constructed and finished with the materials, tools, equipment and methods to be used in constructing the architectural texture, including placement of expansion joints, weakened plane joints and joints between formliner units. If ordered by the Engineer, additional test panels shall be constructed and finished until the specified finish, texture and color are obtained, as determined by the Engineer.

In the event more than two test panels are required by the Engineer, each additional sample will be paid for as extra work as provided in Section 4-1.03D of the Standard Specifications.

The test panel approved by the Engineer shall be used as the standard of comparison in determining acceptability of architectural texture for concrete-surfaces.

FORM LINERS

Form liners shall be used for textured concrete surfaces and shall be installed in conformance with the manufacturer's recommendations, unless other methods of forming textured concrete surfaces are approved by the Engineer. Form liners shall be manufactured from an elastomeric material or a semi-elastomeric polyurethane material by a manufacturer of commercially available concrete form liners. No substitution of other types of formliner material will be allowed. Form liners shall leave crisp, sharp definition of the architectural surface. Recurring textural configurations exhibited by repeating, recognizable shadow patterns shall be prevented by proper casting of form liner patterns. Textured concrete surfaces with such recurring textural configurations shall be reworked to remove such patterns as approved by the Engineer or the concrete shall be replaced.

Form liners shall have the following properties:

Description	ASTM Designation:	Range
Elastomeric material		
Shore A hardness	D 2240	20 to 65
Tensile strength (MPa)	D 412	0.9 to 6.2
Semi-elastomeric polyurethane		
Shore D hardness	D 2240	55 to 65
Tensile strength (MPa)	D 2370	18 minimum

Cuts and tears in form liners shall be sealed and repaired in conformance with the manufacturer's recommendations. Form liners that are delaminated from the form shall not be used. Form liners with deformations to the manufactured surface caused by improper storage practices or any other reason shall not be used.

Form liners shall extend the full vertical length of texturing with joints at 1.2 m minimum spacing and no horizontal or tranverse lines. The vertical line or joint spacing on the Third Street Undercrossing abutment murals shall be only as designated on plan. Small pieces of form liners shall not be used. Grooves shall be aligned straight and true. Grooves shall match at joints between form liners. Joints in the direction of grooves in grooved patterns shall be located only in the depressed portion of the textured concrete. Adjoining liners shall be butted together without distortion, open cracks or offsets at the joints. Joints between liners shall be cleaned before each use to remove any mortar in the joint. There shall not be any horizontal joints between two form liners with the same texture.

Adhesives shall be compatible with the form liner material and with concrete. Adhesives shall be approved by the liner manufacturer. Adhesives shall not cause swelling of the liner material.

RELEASING FORM LINERS

Products and application procedures for form release agents shall be approved by the form liner manufacturer. Release agents shall not cause swelling of the liner material or delamination from the forms. Release agents shall not stain the concrete or react with the liner material. For reliefs simulating fractured concrete or wood grain surfaces the application method shall include the scrubbing method using a natural bristle scrub brush in the direction of grooves or grain. The release agent shall coat the liner with a thin film. Following application of form release agent, the liner surfaces shall be cleaned of excess amounts of agent using compressed air. Buildup of form release agent caused by the reuse of a liner shall be removed at least every 5 uses.

Form liners shall release without leaving particles or pieces of liner material on the concrete and without pulling or breaking concrete from the textured surface. The concrete surfaces exposed by removing forms shall be protected from damage.

ABRASIVE BLASTING

The architectural texture shall be abrasive blasted with fine abrasive to remove the sheen without exposing coarse aggregate.

CURING

Concrete surfaces with architectural texture shall be cured only by the forms-in-place or water methods. Seals and curing compounds shall not be used.

MEASUREMENT AND PAYMENT

Fractured rib texture on abutments and retaining walls (except MSE wall) will be measured and paid for by the square meter.

The contract price paid per square meter for architectural texture of the types listed in the Engineer's Estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in architectural texture, complete in place, including test panels and working drawings, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

PAYMENT

Full compensation for architectural texture on concrete barriers shall be considered as included in the contract price paid per meter for concrete barrier of the types listed in the Engineer's Estimate and no separate payment will be made therefor.

10-1.76 REINFORCEMENT

Reinforcement shall conform to the provisions in Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

The Department's mechanical splices prequalified list can be found at the following internet site:

http://www.dot.ca.gov/hq/esc/approved_products_list/

The provisions of "Welding Quality Control" of these special provisions shall not apply to resistance butt welding.

When joining new reinforcing bars to existing reinforcement, sample splices shall be made using only the deformation pattern of the new reinforcement to be spliced.

Reinforcement shown on the plans to be galvanized shall be galvanized in conformance with the provisions in Section 75-1.05, "Galvanizing," of the Standard Specifications.

MEASUREMENT AND PAYMENT

Measurement and payment for reinforcement in structures shall conform to the provisions in Section 52-1.10, "Measurement," and Section 52-1.11, "Payment," of the Standard Specifications and these special provisions.

Full compensation for galvanizing steel reinforcement shall be considered as included in the prices paid for the various items of work involved and no additional compensation will be allowed therefor.

10-1.77 HEADED BAR REINFORCEMENT

Headed bar reinforcement shall consist of bar reinforcement with heads attached to one or both ends. The type of headed bar reinforcement to be used on this project shall be on the Department's current prequalified list prior to use, and shall conform to the provisions of Section 52, "Reinforcement," of the Standard Specifications, the details shown on the plans, and these special provisions.

The Department maintains a list of prequalified headed bar reinforcement types. The prequalified list can be obtained by contacting the Transportation Laboratory and is available at the Department's internet site at:

http://www.dot.ca.gov/hq/esc/approved_products_list/

GENERAL

Prior to manufacturing, the Contractor shall submit to the Engineer the manufacturer's Quality Control (QC) manual for the fabrication of headed bar reinforcement. As a minimum, the QC manual shall include the following:

- A. The pre-production procedures for the qualification of materials and equipment.
- B. The methods and frequencies for performing QC procedures during production.
- C. The calibration procedures and calibration frequency for all equipment.
- D. A system for the identification and tracking of all friction welds. The system shall have provisions for permanently identifying each weld and the parameters used to perform it.
- E. The welding procedure specification (WPS) for friction welded headed bar reinforcement.
- F. A system for marking headed bar reinforcement.

The provisions of "Welding Quality Control" of these special provisions shall not apply to headed bar reinforcement.

The Contractor shall perform inspection and testing prior to, during, and after manufacturing headed bar reinforcement and as necessary to ensure that materials and workmanship conform to the requirements of the specifications.

A daily production log for the manufacture of headed bar reinforcement shall be maintained by the manufacturer for each production lot. The log shall clearly indicate the production lot numbers, the heats of bar material and head material used in the manufacture of each production lot, the number of bars in each production lot, and manufacturing records, including tracking and production parameters for welds or forgings. The data from the daily production log shall be available to the Engineer upon request.

A production lot of headed bar reinforcement is defined as 150 reinforcing bars, or fraction thereof, of the same bar size, with heads of the same size and type, and manufactured by the same method, produced from bar material of a single heat number and head material of a single heat number. If one reinforcing bar has a head on both ends, it will be counted as two reinforcing bars for the purposes of establishing and testing production lots. A new production lot shall be started if the heat number of either the bar material or the head material changes before the maximum production lot size of 150 is reached.

The Contractor shall furnish Certificates of Compliance accompanied by a copy of the mill test report, the Production Tests Reports specified herein, and the corresponding daily production logs to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for each shipment of headed bar reinforcement delivered to the jobsite.

Welding, welder qualifications, and inspection of welding shall conform to the requirements for friction welding in ANSI/AWS C6.1.

Equipment used to perform friction welding shall be fitted with an effective in-process monitoring system to record essential production parameters that describe the process of welding the head onto the reinforcement. The parameters to be recorded shall include friction welding force, forge force, rotational speed, friction upset distance and time, and forge upset distance and time. The data from this in-process monitoring shall be recorded and preserved by the manufacturer until acceptance of the contract and shall be provided to the Engineer upon request.

PRODUCTION TESTS

Production tests shall be performed at the Contractor's expense, at an independent qualified testing laboratory, and in the presence of the Engineer, unless otherwise directed in writing. The independent qualified testing laboratory used to perform the testing of headed bar reinforcement samples shall not be employed or compensated by any subcontractor, or by other persons or

entities hired by subcontractors who will provide other services or materials for the project, and shall have the following:

- A. A tensile testing machine capable of breaking the largest size of reinforcing bar to be tested.
- B. Operators who have received formal training for performing the testing requirements of ASTM Designation: A 970/A 970M.
- C. A record of annual calibration of testing equipment performed by an independent third party that has 1) standards that are traceable to the National Institute of Standards and Technology, and 2) a formal reporting procedure, including published test forms.

The Engineer shall be notified in writing when any lots of headed bar reinforcement are ready for testing. The notification shall include the number of lots to be tested and the location where the tests are to be conducted. After notification has been received, test samples will be randomly selected by the Engineer from each production lot of headed bar reinforcement which is ready for shipment to the jobsite. If epoxy coating is required, test samples will be taken after the headed bar reinforcement has been prepared for epoxy coating. The Engineer will be at the testing site within a maximum of one week after receiving written notification that the samples are at the testing site and ready for testing. In the event the Engineer fails to be present at the testing site within the time allowed, and if, in the opinion of the Engineer, completion of the work is delayed or interfered with by failure of the Engineer to be present at the testing site, the Contractor will be compensated for any resulting loss in the same manner as provided for in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

A minimum of 3 samples from each production lot shall be tested. One tensile test shall be conducted on each sample.

Tensile tests shall conform to the requirements specified in ASTM Designation: A 970/A 970M, Section 7, except that at rupture, there shall be visible signs of necking in the reinforcing bar 1) at a minimum distance of one bar diameter away from the head to bar connection for friction welded headed bar reinforcement, or 2) outside the affected zone for integrally forged headed bar reinforcement.

The affected zone for integrally forged headed bar reinforcement is the portion of the reinforcing bar where any properties of the bar, including the physical, metallurgical, or material characteristics, have been altered during the manufacturing process.

If one of the test specimens fails to meet the specified requirements, one retest shall be performed on one additional sample, selected by the Engineer, from the same production lot. If the additional test specimen, or if more than one of the original test specimens fail to meet these requirements, all headed bar reinforcement in the lot represented by the tests will be rejected in conformance with the provisions in Section 6-1.04, "Defective Materials," of the Standard Specifications.

A Production Test Report for all testing performed on each lot shall be prepared by the independent testing laboratory and submitted to the Engineer as specified herein. The report shall be signed by an engineer who represents the laboratory and is registered as a Civil Engineer in the State of California. The report shall include the following information for each set: contract number, bridge number, lot number, bar size, type of headed bar reinforcement, physical conditions of test sample, any notable defects, limits of affected zone, location of visible necking area, and the ultimate strength of each headed bar.

Each unit of headed bar reinforcement in a production lot to be shipped to the site shall be tagged in a manner such that production lots can be accurately identified at the jobsite. All unidentified headed bar reinforcement received at the jobsite will be rejected.

MEASUREMENT AND PAYMENT

Quantities of headed bar reinforcement will be measured as units determined from the number of heads shown on the plans or as directed by the Engineer.

The contract unit price paid for headed bar reinforcement shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing headed bar reinforcement, including conforming to all testing requirements, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Bar reinforcement to be used in the manufacture of headed bar reinforcement and placing the completed headed bar reinforcement into the work will be measured and paid for as specified in Section 52, "Reinforcement," of the Standard Specifications, except that the lengths to be used in the computation of calculated masses of the bar reinforcement shall be the entire length of the completed headed bar, including heads.

10-1.78 WATERPROOFING

Waterproofing shall conform to the provisions in Section 54, "Waterproofing," of the Standard Specifications and these special provisions.

Membrane waterproofing shall be applied to the painted undercoat of steel column casings in the same manner provided for waterproofing concrete surfaces.

The exposed surfaces of the membrane waterproofing applied to steel column casings shall be of uniform height above ground without unsightly bulges, depressions or other imperfections.

Full compensation for membrane waterproofing on column casing shall be considered as included in the contract price paid per pound for column casing and no separate payment will be made therefor.

10-1.79 STEEL STRUCTURES

Construction of steel structures shall conform to the provisions in Section 55, "Steel Structures," of the Standard Specifications and these special provisions.

Attention is directed to "Welding" in Section 8, "Materials," of these special provisions. The following substitutions of high-strength steel fasteners shall be made:

METRIC SIZE SHOWN ON THE PLANS	SIZE TO BE SUBSTITUTED
ASTM Designation: A 325M (Nominal bolt diameter (mm))	ASTM Designation: A 325 (Nominal bolt diameter (inch))
13, 12.70, or M12	1/2
16, 15.88, or M16	5/8
19, 19.05, or M20	3/4
22, 22.22, or M22	7/8
24, 25, 25.40, or M24	1
29, 28.58, or M27	1 1/8
32, 31.75, or M30	1 1/4
38, 38.10, or M36	1 1/2

MATERIALS

Structural steel rolled shapes used in overhead sign structures and the Third street Undercrossing (Temp Bridge) shall conform to the Charpy V-notch impact values specified for steel plate in Section 55-2, "Materials," of the Standard Specifications.

High-strength fastener assemblies and other bolts attached to structural steel with nuts and washers shall be zinc-coated. When direct tension indicators are used in these assemblies, the direct tension indicator and all components of the fastener assembly shall be zinc-coated by the mechanical deposition process.

ROTATIONAL CAPACITY TESTING PRIOR TO SHIPMENT TO JOB SITE

Rotational capacity tests shall be performed on all lots of high-strength fastener assemblies prior to shipment of these lots to the project site. Zinc-coated assemblies shall be tested after all fabrication, coating, and lubrication of components has been completed. One hardened washer shall be used under each nut for the tests.

The requirements of this section do not apply to high-strength cap screws or high-strength bolts used for slip base plates.

Each combination of bolt production lot, nut lot, and washer lot shall be tested as an assembly.

A rotational capacity lot number shall be assigned to each combination of lots tested. Each shipping unit of fastener assemblies shall be plainly marked with the rotational capacity lot number.

Two fastener assemblies from each rotational capacity lot shall be tested.

The following equipment, procedure, and acceptance criteria shall be used to perform rotational capacity tests on and determine acceptance of long bolts. Fasteners are considered to be long bolts when full nut thread engagement can be achieved when installed in a bolt tension measuring device:

A. Long Bolt Test Equipment:

1. Calibrated bolt tension measuring device with adequate tension capacity for the bolts being tested.
2. Calibrated dial or digital torque wrench. Other suitable tools will be required for performing Steps 7 and 8 of the Long Bolt Test Procedure. A torque multiplier may be required for large diameter bolts.
3. Spacer washers or bushings. When spacer washers or bushings are required, they shall have the same inside diameter and equal or larger outside diameter as the appropriate hardened washers conforming to the requirements in ASTM Designation: F436.
4. Steel beam or member, such as a girder flange or cross frame, to which the bolt tension measuring device will be attached. The device shall be accessible from the ground.

B Long Bolt Test Procedure:

1. Measure the bolt length. The bolt length is defined as the distance from the end of the threaded portion of the shank to the underside of the bolt head.
2. Install the nut on the bolt so that 3 to 5 full threads of the bolt are located between the bearing face of the nut and the underside of the bolt head. Measure and record the

- thread stickout of the bolt. Thread stickout is determined by measuring the distance from the outer face of the nut to the end of the threaded portion of the shank.
3. Insert the bolt into the bolt tension measuring device and install the required number of washers, and additional spacers as needed, directly beneath the nut to produce the thread stickout measured in Step 2 of this procedure.
 4. Tighten the nut using a hand wrench to a snug-tight condition. The snug tension shall not be less than the Table A value but may exceed the Table A value by a maximum of 2 kips.

Table A

High-Strength Fastener Assembly Tension Values to Approximate Snug-Tight Condition	
Bolt Diameter (inches)	Snug Tension (kips)
1/2	1
5/8	2
3/4	3
7/8	4
1	5
1 1/8	6
1 1/4	7
1 3/8	9
1 1/2	10

5. Match-mark the assembly by placing a heavy reference start line on the face plate of the bolt tension measuring device which aligns with 1) a mark placed on one corner of the nut, and 2) a radial line placed across the flat on the end of the bolt, or on the exposed portions of the threads of tension control bolts. Place an additional mark on the outside of the socket that overlays the mark on the nut corner such that this mark will be visible while turning the nut. Make an additional mark on the face plate, either 2/3 of a turn, one turn, or 1 1/3 turn clockwise from the heavy reference start line, depending on the bolt length being tested as shown in Table B.

Table B Required Nut Rotation for Rotational Capacity (a,b) Tests	
Bolt Length (measured in Step 1)	Required Rotation (turn)
4 bolt diameters or less	2/3
Greater than 4 bolt diameters but no more than 8 bolt diameters	1
Greater than 8 bolt diameters, but no more than 12 bolt diameters (c)	1 1/3
(a) Nut rotation is relative to bolt, regardless of the element (nut or bolt) being turned. For bolts installed by 1/2 turn and less, the tolerance shall be plus or minus 30 degrees; for bolts installed by 2/3 turn and more, the tolerance shall be plus or minus 45 degrees. (b) Applicable only to connections in which all material within grip of the bolt is steel. (c) When bolt length exceeds 12 diameters, the required rotation shall be determined by actual tests in a suitable tension device simulating the actual conditions.	

6. Turn the nut to achieve the applicable minimum bolt tension value listed in Table C. After reaching this tension, record the moving torque, in foot-pounds, required to turn the nut, and also record the corresponding bolt tension value in pounds. Torque shall be measured with the nut in motion. Calculate the value, T (in ft-lbs), where $T = [(\text{the measured tension in pounds}) \times (\text{the bolt diameter in inches}) / 48 \text{ in/ft}]$.

Table C Minimum Tension Values for High-Strength Fastener Assemblies	
Bolt Diameter (inches)	Minimum Tension (kips)
1/2	12
5/8	19
3/4	28
7/8	39
1	51
1 1/8	56
1 1/4	71
1 3/8	85
1 1/2	103

7. Turn the nut further to increase bolt tension until the rotation listed in Table B is reached. The rotation is measured from the heavy reference line made on the face plate after the bolt was snug-tight. Record this bolt tension.
8. Loosen and remove the nut and examine the threads on both the nut and bolt.

C. Long Bolt Acceptance Criteria:

1. An assembly shall pass the following requirements to be acceptable: 1) the measured moving torque (Step 6) shall be less than or equal to the calculated value, T (Step 6), 2) the bolt tension measured in Step 7 shall be greater than or equal to the applicable turn test tension value listed in Table D, 3) the nut shall be able to be removed from the bolt without signs of thread stripping or galling after the required rotation in Step 7 has been achieved, 4) the bolt does not shear from torsion or fail during the test, and 5) the assembly does not seize before the final rotation in Step 7 is reached. Elongation of the bolt in the threaded region between the bearing face of the nut and the underside of the bolt head is expected and will not be considered a failure. Both fastener assemblies tested from one rotational capacity lot shall pass for the rotational capacity lot to be acceptable.

Table D

Turn Test Tension Values	
Bolt Diameter (inches)	Turn Test Tension (kips)
1/2	14
5/8	22
3/4	32
7/8	45
1	59
1 1/8	64
1 1/4	82
1 3/8	98
1 1/2	118

The following equipment, procedure, and acceptance criteria shall be used to perform rotational capacity tests on and determine acceptance of short bolts. Fasteners are considered to be short bolts when full nut thread engagement cannot be achieved when installed in a bolt tension measuring device:

A. Short Bolt Test Equipment:

1. Calibrated dial or digital torque wrench. Other suitable tools will be required for performing Steps 7 and 8 of the Short Bolt Test Procedure. A torque multiplier may be required for large diameter bolts.
2. Spud wrench or equivalent.
3. Spacer washers or bushings. When spacer washers or bushings are required, they shall have the same inside diameter and equal or larger outside diameter as the appropriate hardened washers conforming to the requirements in ASTM Designation: F436.
4. Steel plate or girder with a hole to install bolt. The hole size shall be 1.6 mm greater than the nominal diameter of the bolt to be tested. The grip length, including any plates, washers, and additional spacers as needed, shall provide the proper number of threads within the grip, as required in Step 2 of the Short Bolt Test Procedure.

B. Short Bolt Test Procedure:

1. Measure the bolt length. The bolt length is defined as the distance from the end of the threaded portion of the shank to the underside of the bolt head.

2. Install the nut on the bolt so that 3 to 5 full threads of the bolt are located between the bearing face of the nut and the underside of the bolt head. Measure and record the thread stickout of the bolt. Thread stickout is determined by measuring the distance from the outer face of the nut to the end of the threaded portion of the shank.
3. Install the bolt into a hole on the plate or girder and install the required number of washers and additional spacers as needed between the bearing face of the nut and the underside of the bolt head to produce the thread stickout measured in Step 2 of this procedure.
4. Tighten the nut using a hand wrench to a snug-tight condition. The snug condition shall be the full manual effort applied to the end of a 305 mm long wrench. This applied torque shall not exceed 20 percent of the maximum allowable torque in Table E.

Table E
Maximum Allowable Torque for High-Strength
Fastener Assemblies

Bolt Diameter (inches)	Torque (ft-lbs)
1/2	145
5/8	285
3/4	500
7/8	820
1	1220
1 1/8	1500
1 1/4	2130
1 3/8	2800
1 1/2	3700

5. Match-mark the assembly by placing a heavy reference start line on the steel plate or girder which aligns with 1) a mark placed on one corner of the nut and 2) a radial line placed across the flat on the end of the bolt or on the exposed portions of the threads of tension control bolts. Place an additional mark on the outside of the socket that overlays the mark on the nut corner such that this mark will be visible while turning the nut. Make 2 additional small marks on the steel plate or girder, one 1/3 of a turn and one 2/3 of a turn clockwise from the heavy reference start line on the steel plate or girder.
6. Using the torque wrench, tighten the nut to the rotation value listed in Table F. The rotation is measured from the heavy reference line described in Step 5 made after the bolt was snug-tight. A second wrench shall be used to prevent rotation of the bolt head during tightening. Measure and record the moving torque after this rotation has been reached. The torque shall be measured with the nut in motion.

Table F Nut Rotation Required for Turn-of-Nut (a,b) Installation	
Bolt Length (measured in Step 1)	Required Rotation (turn)
4 bolt diameters or less	1/3
(a) Nut rotation is relative to bolt, regardless of the element (nut or bolt) being turned. For bolts installed by 1/2 turn and less, the tolerance shall be plus or minus 30 degrees. (b) Applicable only to connections in which all material within grip of the bolt is steel.	

7. Tighten the nut further to the 2/3-turn mark as indicated in Table G. The rotation is measured from the heavy reference start line made on the plate or girder when the bolt was snug-tight. Verify that the radial line on the bolt end or on the exposed portions of the threads of tension control bolts is still in alignment with the start line.

Table G Required Nut Rotation for Rotational Capacity Test	
Bolt Length (measured in Step 1)	Required Rotation (turn)
4 bolt diameters or less	2/3

8. Loosen and remove the nut and examine the threads on both the nut and bolt.

C. Short Bolt Acceptance Criteria:

1. An assembly shall pass the following requirements to be acceptable: 1) the measured moving torque from Step 6 shall be less than or equal to the maximum allowable torque from Table E, 2) the nut shall be able to be removed from the bolt without signs of thread stripping or galling after the required rotation in Step 7 has been achieved, 3) the bolt does not shear from torsion or fail during the test, and 4) the assembly shall not seize before the final rotation in Step 7 is reached. Elongation of the bolt in the threaded region between the bearing face of the nut and the underside of the bolt head will not be considered a failure. Both fastener assemblies tested from one rotational capacity lot shall pass for the rotational capacity lot to be acceptable.

INSTALLATION TENSION TESTING AND ROTATIONAL CAPACITY TESTING AFTER ARRIVAL ON THE JOB SITE

Installation tension tests and rotational capacity tests on high-strength fastener assemblies shall be performed by the Contractor prior to acceptance or installation and after arrival of the fastener assemblies on the project site. Installation tension tests and rotational capacity tests shall be performed at the job-site, in the presence of the Engineer, on each rotational capacity lot of fastener assemblies.

The requirements of this section do not apply to high-strength cap screws or high-strength bolts used for slip base plates.

Installation tension tests shall be performed on 3 representative fastener assemblies in conformance with the provisions in Section 8, "Installation," of the RCSC Specification. For short bolts, Section 8.2, "Pretensioned Joints," of the RCSC Specification shall be replaced by

the "Pre-Installation Testing Procedures," of the "Structural Bolting Handbook," published by the Steel Structures Technology Center, Incorporated.

The rotational capacity tests shall be performed in conformance with the requirements for rotational capacity tests in "Rotational Capacity Testing Prior to Shipment to Job Site" of these special provisions.

At the Contractor's expense, additional installation tension tests, tests required to determine job inspecting torque, and rotational capacity tests shall be performed by the Contractor on each rotational capacity lot, in the presence of the Engineer, if 1) any fastener is not used within 3 months after arrival on the jobsite, 2) fasteners are improperly handled, stored, or subjected to inclement weather prior to final tightening, 3) significant changes are noted in original surface condition of threads, washers, or nut lubricant, or 4) the Contractor's required inspection is not performed within 48 hours after all fasteners in a joint have been tensioned.

Failure of a job-site installation tension test or a rotational capacity test will be cause for rejection of unused fasteners that are part of the rotational capacity lot.

When direct tension indicators are used, installation verification tests shall be performed in conformance with Appendix Section X1.4 of ASTM Designation: F959, except that bolts shall be initially tensioned to a value 5 percent greater than the minimum required bolt tension.

SURFACE PREPARATION

For all bolted connections, the new contact surfaces shall be cleaned and coated before assembly in conformance with the provisions for cleaning and painting structural steel of these special provisions.

SEALING

When zinc-coated tension control bolts are used, the sheared end of each fastener shall be completely sealed with non-silicone type sealing compound conforming to the provisions in Federal Specification TT-S-230, Type II. The sealant shall be gray in color and shall have a minimum thickness of 1.3 mm. The sealant shall be applied to a clean sheared surface on the same day that the splined end is sheared off.

WELDING

Table 2.2 of AWS D1.5 is superseded by the following table:

Base Metal Thickness of the Thicker Part Joined, mm	Minimum Effective Partial Joint Penetration Groove Weld Size, * mm
Over 6 to 13 inclusive	5
Over 13 to 19 inclusive	6
Over 19 to 38 inclusive	8
Over 38 to 57 inclusive	10
Over 57 to 150 inclusive	13
Over 150	16

* Except the weld size need not exceed the thickness of the thinner part

Dimensional details and workmanship for welded joints in tubular and pipe connections shall conform to the provisions in Part A, "Common Requirements of Nontubular and Tubular Connections," and Part D, "Specific Requirements for Tubular Connections," in Section 2 of AWS D1.1.

The requirement of conformance with AWS D1.5 shall not apply to work conforming to Section 56-1, "Overhead Sign Structures," or Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications.

MEASUREMENT AND PAYMENT

If a portion of or all check samples are removed at a mill more than 480 air line kilometers from both Sacramento and Los Angeles, shop inspection expenses will be sustained by the State which are in addition to expenses incurred for fabrication site inspection. Payment to the Contractor for furnishing structural steel will be reduced \$2,000 for each mill located more than 480 air line kilometers from both Sacramento and Los Angeles.

Full compensation for Bearing Assembly at Third Street UC (Temp) Bridge including bearing pads and sole plate, anchor bolts, washer and nuts, as shown on the plans, shall be considered as included in the contract price paid per kilogram for Furnish Structural Steel (Bridge) and no separate payment/additional compensation will be made/allowed therefor.

10-1.80 ISOLATION CASING

Isolation casing shall consist of furnishing and installing corrugated steel pipe isolation casing in conformance with the details shown on the plans, the provisions in Section 66, "Corrugated Metal Pipe," and Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

Resin capsule anchors shall conform to the provisions in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications.

Corrugated steel pipe shall be fabricated from zinc-coated steel sheet.

Steel cover plates, angle brackets and concrete anchorage devices shall conform to the provisions in Section 75, "Miscellaneous Bridge Metal," of the Standard Specifications and shall be galvanized.

Corrugated steel pipe edges shall be free of torn metal, burrs, and sharp edges. Sharp edges and edges that are marred, cut or roughened in handling or installation, shall be slightly rounded by grinding or other suitable means prior to cleaning and painting.

All edges of the corrugated steel pipe shall be cleaned as specified in Section 59-2.06 "Hand Cleaning," of the Standard Specifications and painted with at least 2 applications of unthinned zinc-rich primer (organic vehicle type) conforming to the provisions in Section 91, "Paint." Aerosol cans shall not be used.

Neoprene strips shall conform to the provisions for strip waterstops in Section 51-1.145, "Strip Waterstops," of the Standard Specifications, except that protective board will not be required.

Structure backfill placed outside the isolation casing as shown on the plans shall be compacted to a relative compaction of not less than 95 percent. Ponding and jetting of the structure backfill will not be permitted.

The pourable seal as shown on plans shall conform to the requirements for Type A and AL seals in Section 51-1.12F(3), "Materials and Installation," of the Standard Specifications.

Concrete for leveling pads and concrete seals as shown on plans shall be produced from minor concrete conforming to the provisions in Section 90-10, "Minor Concrete."

MEASUREMENT AND PAYMENT

Isolation casings will be measured and paid for in conformance with the provisions in Section 75-1.06, "Measurement," of the Standard Specifications and these special provisions.

The contract price paid per kilogram for isolation casing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals and for doing all the work involved in furnishing and installing isolation casing, complete in place, including corrugated steel pipe, edge preparation, galvanized steel cover plates, angles and concrete anchorage devices; neoprene strips; steel bars, circular strap plates, concrete for leveling pads and concrete seal, pourable seals, backer rod and structure backfill, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.81 COLUMN CASINGS

Column casings shall consist of cleaned and painted structural steel shells filled with grout as shown on the plans and conforming to the provisions in Section 55, "Steel Structures," of the Standard Specifications and these special provisions.

Attention is directed to "Welding Quality Control" of these special provisions.

For field welding of column casings, only visual inspection will be required, and the requirements of the second sentence of paragraph 3.13.2 and the first sentence of paragraph 3.13.3 of AWS D1.5 will not apply.

Structural steel for column casings shall conform to the requirements in ASTM Designation: A 36/A 36M, or, at the Contractor's option, ASTM Designation: A 709/A 709M, Grade 36.

The spaces to be occupied by the column casing materials shall be cleared of plants and other materials prior to encasing the column.

Removed plants and other materials shall be disposed of outside the highway right of way in conformance with the provisions in Section 7-1.13, "Disposal of Material Outside the Highway Right of Way," of the Standard Specifications.

CLEAN AND PAINT COLUMN CASING

New metal surfaces, except where galvanized, shall be cleaned and painted in conformance with the provisions in Sections 59-2, "Painting Structural Steel," and 91, "Paint," of the Standard Specifications and these special provisions.

Prior to performing any painting or paint removal, the Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 3 copies of a separate Painting Quality Work Plan (PQWP) for each item of work for which painting or paint removal is to be performed. As a minimum, each PQWP shall include the following:

- A. The name of each Contractor or subcontractor to be used.
- B. One copy each of all current "SSPC: The Society for Protective Coatings" specifications or qualification procedures which are applicable to the painting or paint removal to be performed. These documents shall become the permanent property of the Department.
- C. A copy of the coating manufacturer's guidelines and recommendations for surface preparation, painting, drying, curing, handling, shipping, and storage of painted structural steel, including testing methods and maximum allowable levels for soluble salts.
- D. Proposed methods and equipment to be used for any paint application.

- E. Proof of each of any required certifications, SSPC-QP 1, SSPC-QP 3. Where SSPC-QP 3 certification is required, an enclosed shop facility shall be required. Certification of AISC Sophisticated Paint Endorsement Quality Program, P-1 Enclosed endorsement, will be considered equivalent to SSPC-QP 3.
 - 1. In lieu of certification in conformance with the requirements in SSPC-QP 1 for this project, the Contractor may submit written documentation showing conformance with the requirements in Section 3, "General Qualification Requirements," of SSPC-QP 1.
- F. Proposed methods to control environmental conditions in accordance with the manufacturer's recommendations and these special provisions.
- G. Proposed methods to protect the coating during curing, shipping, handling, and storage.
- H. Proposed rinse water collection plan.
- I. A detailed paint repair plan for the repair of damaged areas.
- J. Procedures for containing blast media and water during application of coatings and coating repair of erected steel.
- K. Examples of proposed daily reports for all testing to be performed, including type of testing, location, lot size, time, weather conditions, test personnel, and results.

Prior to submitting the PQWP, a pre-painting meeting between the Engineer, the Contractor, and a representative from each entity performing painting for this project shall be held to discuss the requirements for the PQWP.

The Contractor shall allow the Engineer 3 weeks to approve the PQWP submittal after a complete plan has been received. No painting or paint removal shall be performed until the PQWP for that work is approved by the Engineer. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in approving the PQWP, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The Engineer's approval of the Contractor's PQWP shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work in conformity with the requirements of the plans and specifications.

The Contractor shall provide enclosures to permit cleaning and painting during inclement weather. Provisions shall be made to control atmospheric conditions inside the enclosures within specified limits during cleaning and painting operations, drying to solvent insolubility, and throughout the curing period in accordance with the manufacturer's recommendations and these special provisions. Full compensation for providing and maintaining such enclosures shall be considered as included in the prices paid for the various contract items of work requiring cleaning and painting, and no additional compensation will be allowed therefor.

Fresh, potable water with a maximum chloride content of 75 mg/L and a maximum sulfate content of 200 mg/L shall be used for water rinsing or pressure washing operations. No continuous recycling of rinse water will be permitted. If rinse water is collected into a tank and subsequent testing determines the collected water conforms to the specified requirements, reuse may be permitted by the Engineer if no collected water is added to the tank after sample collection for determination of conformance to specified requirements.

Column casing surfaces in contact with grout shall not be considered embedded in concrete.

Column casing surfaces to be painted with inorganic zinc coating shall be blast cleaned and painted with the single undercoat prior to shipment to the job site.

Cleaning

The surfaces to be cleaned and painted shall be dry blast cleaned in conformance with the requirements of SSPC-SP 10, "Near White Blast Cleaning," of the "SSPC: The Society for Protective Coatings." Blast cleaning shall leave surfaces with a dense, uniform, angular anchor pattern of not less than 40 μm nor more than 86 μm as measured in conformance with the requirements in ASTM Designation: D 4417.

Mineral and slag abrasives used for blast cleaning steel surfaces shall conform to the requirements for Class A, Grade 2 to 3 abrasives contained in SSPC-AB 1, "Mineral and Slag Abrasives," of the "SSPC: The Society for Protective Coatings," and shall not contain hazardous material.

Steel abrasives used for blast cleaning steel surfaces shall comply with the requirements of SSPC-AB 3, "Ferrous Metallic Abrasive," of the "SSPC: The Society for Protective Coatings." If steel abrasive is recycled through shop or field abrasive blast cleaning units, the recycled abrasive shall conform to the requirements of SSPC-AB 2, "Specification for Cleanliness of Recycled Ferrous Metallic Abrasive," of the "SSPC: The Society for Protective Coatings."

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications and a Material Safety Data Sheet shall be furnished prior to use for each shipment of blast cleaning material for steel.

Abrasive blast cleaned surfaces shall be tested by the Contractor for soluble salts using a Class A or B retrieval method as described in Technology Guide 15, "Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates," of the "SSPC: The Society for Protective Coatings," and cleaned so the maximum level of soluble salts does not exceed the lesser of the coating manufacturer's written recommendations or 10 micrograms per square centimeter. Areas of abrasive blast cleaned steel shall be tested at the rate of 3 tests for the first 100 square meters prepared per day, and one test for each additional 100 square meters or portion thereof, at locations selected by the Engineer. When less than 100 square meters of surface area is prepared in a shift, at least 2 tests shall be performed. If levels of soluble salts exceed the maximum allowed by these special provisions, the entire area represented by the testing will be rejected. The Contractor shall perform additional cleaning and testing of rejected areas until soluble salt levels conform to these requirements.

Corners shall be chamfered to remove sharp edges.

Thermal cut edges (TCEs) to be painted shall be conditioned before blast cleaning by shallow grinding or other method approved by the Engineer to remove the thin, hardened layer of material resulting from resolidification during cooling.

Visually evident base metal surface irregularities and defects shall be removed in accordance with ASTM Designation: A 6 or AASHTO Designation: M 160 prior to blast cleaning steel. When material defects exposed by blast cleaning are removed, the blast profile shall be restored by either blast cleaning or by using mechanical tools in accordance with SSPC-SP 11, "Power Tool Cleaning to Bare Metal," of the "SSPC: The Society for Protective Coatings."

Painting

Blast cleaned surfaces shall receive a single undercoat of an inorganic zinc coating, and exposed surfaces shall receive a minimum of 2 finish coats of an exterior grade latex paint supplied by the manufacturer of the inorganic zinc coating. The single undercoat shall consist of an inorganic zinc coating conforming to the requirements in AASHTO Designation: M 300, Type I or Type II, except that: 1) the first 3 sentences of Section 5.6, "Primer Field Performance

Requirements," shall not apply for Type II coatings, and 2) the entire Section 4.7.1 shall not apply for either type of inorganic zinc coating.

If the Contractor proposes to use a Type I coating, the Contractor shall furnish to the Engineer for review documentation as required in Section 5.6 of AASHTO Designation: M 300. The Contractor shall allow the Engineer 4 weeks to review the proposal.

If the Contractor proposes to use a Type II coating, the coating shall be selected from the qualified products list, which may be obtained from the Transportation Laboratory.

Inorganic zinc coating shall be used within 12 hours of initial mixing.

Application of inorganic zinc coating shall conform to the provisions for applying zinc-rich coating in Section 59-2.13, "Application of Zinc-Rich Primer," of the Standard Specifications.

The single undercoat of inorganic zinc coating shall be applied to the required dry film thickness in 2 or more applications within 8 hours of the start of blast cleaning. Abrasive blast cleaned steel shall not be exposed to relative humidity exceeding 85 percent prior to application of inorganic zinc coating.

The total dry film thickness of all applications of the single undercoat of inorganic zinc coating shall be not less than 100 μm nor more than 200 μm .

Damaged areas and areas where mudcracking occurs in the inorganic zinc coating shall be blast cleaned and repainted with inorganic zinc coating to the specified thickness.

Steel surfaces coated with Type II inorganic zinc coating shall be protected from conditions that may cause the coating film to dissolve. The Contractor, at the Contractor's expense, shall repair areas where the coating has dissolved by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Dry spray, or overspray, as defined in the Steel Structures Painting Manual, Volume 1, "Good Painting Practice," of the "SSPC: The Society for Protective Coatings," shall be removed prior to application of subsequent coats or final acceptance. Removal of dry spray shall be by screening or other methods that minimize polishing of the inorganic zinc surface. The dry film thickness of the coating after removal of dry spray shall be in conformance with the provisions for applying the single undercoat, as specified herein.

The Contractor shall test the inorganic zinc coating prior to application of finish coats. The locations of the tests will be determined by the Engineer. The Contractor shall determine the sequence of the testing operations. The testing for adhesion and hardness will be performed no sooner than 72 hours after application of the single undercoat of inorganic zinc coating. At the Contractor's expense, satisfactory access shall be provided to allow the Engineer to determine the location of the tests.

The inorganic zinc coating shall pass the following tests:

- A. The inorganic zinc coating shall have a minimum adhesion to steel of 4 MPa when measured using a self-aligning adhesion tester in conformance with the requirements in ASTM Designation: D 4541. The Engineer will select 3 locations per column casing section for adhesion testing. If 2 or more of the locations tested fail to meet adhesion requirements, the section will be rejected. If one of the locations tested fails to meet adhesion requirements, an additional 3 locations shall be tested. Should any of the additional locations fail to meet adhesion requirements, the column casing section will be rejected. The Contractor, at the Contractor's expense, shall repair the rejected area by blast cleaning and repainting with inorganic zinc to the specified thickness. Test locations for areas of inorganic zinc meeting adhesion testing requirements shall be repaired by application of organic zinc primer as specified in Section 91-1.04, "Materials," of the Standard Specifications to the specified minimum dry film thickness.

- B. Areas of inorganic zinc coating where finish coats are to be applied shall be tested by the Contractor for soluble salts using a Class A or B retrieval method as described in Technology Guide 15, "Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates," of the "SSPC: The Society for Protective Coatings," and cleaned so the maximum level of soluble salts does not exceed the lesser of the manufacturer's written recommendations or 10 micrograms per square centimeter. Areas of inorganic zinc coating shall be tested at the rate of 3 tests for the first 100 square meters to be painted per day and one test for each additional 100 square meters or portion thereof at locations selected by the Engineer. When less than 100 square meters of surface area is painted in a shift, at least 2 tests shall be performed. If levels of soluble salts exceed the maximum allowed by these special provisions, the entire area represented by the testing will be rejected. The Contractor shall perform additional cleaning and testing of rejected areas until soluble salt levels conform to these requirements.
- C. Prior to application of finish coats, the inorganic zinc coating shall exhibit a solid, hard, and polished metal surface when firmly scraped with the knurled edge of a quarter. Inorganic zinc coating that is powdery, soft, or does not exhibit a polished metal surface, as determined by the Engineer, shall be repaired by the Contractor, at the Contractor's expense, by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Additional Requirements for Water Borne Inorganic Zinc Primers

- A. The surface pH of the inorganic zinc primer shall be tested by wetting the surface with de-ionized water for a minimum of 15 minutes but no longer than 30 minutes and applying pH paper with a capability of measuring in increments of 0.5 pH units. At least 2 surface pH readings shall be taken for every 50 square meters or portion thereof. If less than 50 square meters of steel is coated in a single shift or day, at least 2 surface pH readings shall be taken for primer applied during that period. Application of finish coats will not be permitted until the surface pH is less than or equal to 7.
- B. Dry to solvent insolubility for water borne inorganic zinc primers shall be determined in conformance with the requirements in ASTM Designation: D 4752, except that water shall be the solvent. The resistance rating shall be not less than 4. Areas of inorganic zinc coating shall be tested for solvent insolubility at the rate of one test per 50 square meters or portion thereof. Inorganic zinc coating represented by the tested area that does not meet the solvent insolubility requirements will be rejected. The Contractor, at the Contractor's expense, shall repair rejected areas by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Additional Requirements for Solvent Borne Inorganic Zinc Primers

- A. Dry to solvent insolubility for solvent borne inorganic zinc primers shall be determined in conformance with the requirements in ASTM Designation: D 4752. The resistance rating shall be not less than 4. Areas of inorganic zinc coating shall be tested for solvent insolubility at the rate of one test per 50 square meters or portion thereof. Inorganic zinc coating represented by the tested area that does not meet the solvent insolubility requirements will be rejected. The Contractor, at the Contractor's expense, shall repair

rejected areas by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

- B. Surface hardness of solvent borne inorganic zinc shall be a minimum 2H when measured in conformance with the requirements in ASTM Designation: D 3363. Areas of inorganic zinc coating shall be tested at the rate of one test per 50 square meters or portion thereof. Inorganic zinc coating that fails to meet the surface hardness requirements shall be repaired by the Contractor, at the Contractor's expense, by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

The Contractor, at the Contractor's expense, shall retest all rejected areas of inorganic zinc coating after repairs have been completed.

Except as approved by the Engineer, a minimum curing time of 72 hours shall be allowed between application of inorganic zinc coating and water rinsing.

Exposed areas of inorganic zinc coating where finish coats are specified shall be thoroughly water rinsed.

The first finish coat shall be applied within 48 hours following water rinsing.

The finish coat paint shall be formulated for application to inorganic zinc coating, shall meet the requirements for SSPC-Paint 24, "Latex Semi-Gloss Exterior Topcoat," of the "SSPC: The Society for Protective Coatings," and shall conform to the following:

- A. No visible color change in the finish coats shall occur when tested for 800 hours in conformance with the requirements in ASTM Designation: D 4587, Test Cycle 2.
- B. The vehicle shall be an acrylic or modified acrylic copolymer with a minimum of necessary additives.

The first finish coat shall be applied in 2 applications. The first application shall consist of a spray applied mist application. The second application shall be applied after the mist application has dried to a set to touch condition as determined by the procedure described in Section 7 of ASTM Designation: D1640. The first finish coat color shall match Federal Standard 595B, No. 36628. The total dry film thickness of both applications of the first finish coat shall be not less than 50 μm .

Except as approved by the Engineer, a minimum drying time of 12 hours shall be allowed between finish coats.

The second finish coat color shall match Federal Standard 595B, No. 26408. The total dry film thickness of all applications of the second finish coat shall be not less than 50 μm .

The 2 finish coats shall be applied in 3 or more applications to a total dry film thickness of not less than 100 μm nor more than 200 μm .

The total dry film thickness of all applications of inorganic zinc coating and finish coat paint shall be not less than 200 μm nor more than 350 μm .

GROUTING

Grouting shall conform to the provisions in Section 50-1.09, "Bonding and Grouting," of the Standard Specifications and these special provisions.

The Contractor shall limit the height of each lift of grout to minimize undulations and displacements of the surface of the shell during grouting. Undulations in the shell surface, including undulations from fabrication and erection, shall not exceed 6 mm in 300 mm nor shall the total displacement from plan location exceed 50 mm at any point. At the Contractor's option, a bracing system or other means may be employed to restrain the casing within the specified

tolerances. Except where shown on the plans, restraints shall not pass through the columns. The grout shall harden prior to placing the next lift of grout, unless a bracing system is used.

Suitable external grout injection valves shall be installed for filling of the casings. The filling operation shall begin at the bottom of the casing. Spacing of the valves shall be such that the grout will fill the gap between the casing and column.

Casings shall be sealed at the bottom. Grout shall be pumped into the casing such that the grout head is maintained uniformly around the column, and no visible evidence of water or air is ejected at the top of the grout. The grout at the casing top shall be covered with mortar and sloped to drain. Mortar shall conform to the provisions in Section 51-1.135, "Mortar," of the Standard Specifications.

Casings shall be positioned with spacers to center the casing around the existing column at the location shown on the plans. Spacers may be welded to the inside of the casing. Grout shall not be permitted to flow across shoulders or lanes occupied by public traffic, or to flow into gutters or other drainage facilities.

Clamps, valves, injection ports, lifting ears, and other accessories shall be completely removed not less than 24 hours after placing grout. Voids shall be filled with mortar and finished flush with the exterior surface of the casing.

MEASUREMENT AND PAYMENT

Column casings will be measured and paid for in conformance with the provisions in Section 55-4, "Measurement and Payment," of the Standard Specifications and these special provisions.

The contract price paid per kilogram for column casing shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in column casings filled with grout, complete in place, cleaning and painting of structural steel, and testing, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.82 SIGN STRUCTURES

Sign structures and foundations for overhead signs shall conform to the provisions in Section 56-1, "Overhead Sign Structures," of the Standard Specifications, "Steel Structures" of these special provisions, and the following requirements.

Before commencing fabrication of sign structures, the Contractor shall submit 2 sets of working drawings to the Engineer in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications. The working drawings shall include sign panel dimensions, span lengths, post heights, anchorage layouts, proposed splice locations, a snugging and tensioning pattern for anchor bolts and high-strength bolted connections, and details for permanent steel anchor bolt templates. The working drawings shall be supplemented with a written quality control program that includes methods, equipment, and personnel necessary to satisfy the requirements specified herein.

Working drawings shall be 559 mm x 864 mm or 279 mm x 432 mm in size and each drawing and calculation sheet shall include the State assigned designations for the sign structure type and reference as shown on the contract plans, District-County-Route-Kilometer Post, and contract number.

The Engineer shall have 30 days to review the sign structure working drawings after a complete submittal has been received. No fabrication or installation of sign structures shall be performed until the working drawings are approved in writing by the Engineer.

Should the Engineer fail to complete the review within the time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the sign structure working drawings, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

Steel bolts not designated on the plans as high strength (HS) or stainless steel shall be for general applications and shall conform to the requirements in ASTM Designation: A 307.

A permanent steel template shall be used to maintain the proper anchor bolt spacing.

One top nut, one leveling nut, and 2 washers shall be provided for the upper threaded portion of each anchor bolt.

Flatness of surfaces for the following shall conform to the requirements in ASTM Designation: A 6/A 6M:

1. Base plates that are to come in contact with concrete, grout, or washers and leveling nuts
2. Plates in high-strength bolted connections

No holes shall be made in members unless the holes are shown on the plans or are approved in writing by the Engineer.

Longitudinal seam welds shall have 60 percent minimum penetration, except that within 150 mm of circumferential welds, longitudinal seam welds shall be complete joint penetration (CJP) groove welds. In addition, longitudinal seam welds on structures having telescopic pole segment splices shall be CJP groove welds on the female end for a length on each end equal to the designated slip fit splice length plus 150 mm.

Steel members used for overhead sign structures shall receive nondestructive testing (NDT) in conformance with AWS D1.1 and the following:

1.

Weld Location	Weld Type	Minimum Required NDT
Splice welds around the perimeter of tubular sections, poles, and arms.	CJP groove weld with backing ring	100% UT ^a or RT ^b
Longitudinal seam welds	CJP or PJP ^c groove weld	Random 25% MT ^d
Longitudinal seam welds within 150 mm of a circumferential splice.	CJP groove weld	100% UT or RT
Welds attaching base plates, flange plates, or pole or mast arm plates, to poles or arm tubes.	CJP groove weld with backing ring and reinforcing fillet	t > 4.5 mm: 100% UT and MT t < 4.5 mm: 100% MT after root weld pass & final weld pass t = pole or arm thickness
	External (top) fillet weld for socket-type connections	100% MT

^a ultrasonic testing

^b radiographic testing

^c partial joint penetration

^d magnetic particle testing

2. The acceptance and repair criteria for UT of welded joints where any of the members are less than 8 mm thick or where tubular sections are less than 325 mm in diameter shall conform to the requirements in AWS D1.1, Section 6.13.3.1. A written procedure approved by the Engineer shall be used when performing this UT. These written

- procedures shall conform to the requirements in AWS D1.1, Annex K. The acceptance and repair criteria for other welded joints receiving UT shall conform to the requirements in AWS D1.1, Section 6, Table 6.3 for cyclically loaded nontubular connections.
3. The acceptance and repair criteria for radiographic or real time image testing shall conform to the requirements of AWS D1.1 for tensile stress welds.
 4. For longitudinal seam welds, the random locations for NDT will be selected by the Engineer. The cover pass shall be ground smooth at the locations to be tested. If repairs are required in a portion of a tested weld, the repaired portion shall receive NDT, and additional NDT shall be performed on untested portions of the weld. The additional NDT shall be performed on 25 percent of that longitudinal seam weld. After this additional NDT is performed and if more repairs are required, then that entire longitudinal seam weld shall receive NDT.

Circumferential welds and base plate to post welds may be repaired only one time without written permission from the Engineer.

All ferrous metal parts of tubular sign structures shall be galvanized and shall not be painted.

Full compensation for furnishing anchor bolt templates and for testing of welds shall be considered as included in the contract price paid per kilogram for furnish sign structure, and no additional compensation will be allowed therefor.

10-1.83 CLEAN AND PAINT SIGN STRUCTURES

Sign structures shall be cleaned and painted in conformance with the provisions in Section 56-1.05, "Surface Finish," and Section 91, "Paint," of the Standard Specifications and these special provisions.

Prior to performing any painting or paint removal, the Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 3 copies of a separate Painting Quality Work Plan (PQWP) for each item of work for which painting or paint removal is to be performed. As a minimum, each PQWP shall include the following:

- A. The name of each Contractor or subcontractor to be used.
 - B. One copy each of all current ASTM and "SSPC: The Society for Protective Coatings" specifications or qualification procedures applicable to the painting or paint removal to be performed. These documents shall become the permanent property of the Department.
 - C. A copy of the coating manufacturer's guidelines and recommendations for surface preparation, painting, drying, curing, handling, shipping, and storage of painted structural steel, including testing methods and maximum allowable levels for soluble salts.
 - D. Proposed methods and equipment to be used for any paint application.
 - E. Proof of each of any required certifications, SSPC-QP 1, SSPC-QP 2, SSPC-QP 3. Where SSPC-QP 3 certification is required, an enclosed shop facility shall be required. Certification of AISC Sophisticated Paint Endorsement Quality Program, P-1 Enclosed endorsement, will be considered equivalent to SSPC-QP 3.
1. In lieu of certification in conformance with the requirements in SSPC-QP 1 for this project, the Contractor may submit written documentation showing conformance with the requirements in Section 3, "General Qualification Requirements," of SSPC-QP 1.

2. In lieu of certification in conformance with the requirements in SSPC-QP 2 for this project, the Contractor may submit written documentation showing conformance with the requirements in Sections 4.2 through 4.6 of SSPC-QP 2.
- F. Proposed methods to control environmental conditions in accordance with the manufacturer's recommendations and these special provisions.
 - G. Proposed methods to protect the coating during curing, shipping, handling, and storage.
 - H. Proposed rinse water collection plan.
 - I. A detailed paint repair plan for the repair of damaged areas.
 - J. Procedures for containing blast media and water during application of coatings and coating repair of erected steel.
 - K. Examples of proposed daily reports for all testing to be performed, including type of testing, location, lot size, time, weather conditions, test personnel, and results.

The Engineer shall have 3 weeks to approve the PQWP submittal after a complete plan has been received. No painting or paint removal shall be performed until the PQWP for that work is approved by the Engineer. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in approving the PQWP, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

It is understood that the Engineer's approval of the Contractor's PQWP shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work in conformity with the requirements of the plans and specifications.

~~List the station location and identification of sign structures in the table.~~

CLEAN AND PAINT UNGALVANIZED SURFACES

Ungalvanized steel surfaces to be cleaned and painted shall be dry blast cleaned in conformance with the requirements of SSPC-SP 10, "Near White Blast Cleaning," of the "SSPC: The Society for Protective Coatings." Blast cleaning shall leave surfaces with a dense, uniform, angular anchor pattern of no less than 40 μm nor more than 86 μm as measured in conformance with the requirements in ASTM Designation: D 4417.

Mineral and slag abrasives used for blast cleaning steel surfaces shall conform to the requirements for Class A, Grade 2 to 3 abrasives contained in SSPC-AB 1, "Mineral and Slag Abrasives," of the "SSPC: The Society for Protective Coatings," and shall not contain hazardous material.

Steel abrasives used for blast cleaning steel surfaces shall comply with the requirements of SSPC-AB 3, "Ferrous Metallic Abrasive," of the "SSPC: The Society for Protective Coatings." If steel abrasive is recycled through shop or field abrasive blast cleaning units, the recycled abrasive shall conform to the requirements of SSPC-AB 2, "Specification for Cleanliness of Recycled Ferrous Metallic Abrasive," of the "SSPC: The Society for Protective Coatings."

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications and a Material Safety Data Sheet shall be furnished prior to use for each shipment of blast cleaning material for steel.

Abrasive blast cleaned surfaces shall be tested by the Contractor for soluble salts using a Class A or B retrieval method as described in Technology Guide 15, "Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates," of the "SSPC: The Society for Protective Coatings," and cleaned so the maximum level of soluble salts does not

exceed the lesser of the coating manufacturer's written recommendations or 10 micrograms per square centimeter. Areas of abrasive blast cleaned steel shall be tested at the rate of 3 tests for the first 100 square meters prepared per day, and one test for each additional 100 square meters or portion thereof, at locations selected by the Engineer. When less than 100 square meters of surface area is prepared in a shift, at least 2 tests shall be performed. If levels of soluble salts exceed the maximum allowed by these special provisions, the entire area represented by the testing will be rejected. The Contractor shall perform additional cleaning and testing of rejected areas until soluble salt levels conform to these requirements.

Blast cleaned surfaces shall receive a single undercoat consisting of an inorganic zinc coating conforming to the requirements in AASHTO Designation: M 300, Type I or Type II, except that: 1) the first 3 sentences of Section 5.6, "Primer Field Performance Requirements," shall not apply for Type II coatings, and 2) the entire Section 5.6.1 shall not apply for either type of inorganic zinc coating.

If the Contractor proposes to use a Type I coating, the Contractor shall furnish to the Engineer for review documentation as required in Section 5.6 of AASHTO Designation: M 300. The Contractor shall allow the Engineer 4 weeks to review the proposal.

If the Contractor proposes to use a Type II coating, the coating shall be selected from the qualified products list, which may be obtained from the Transportation Laboratory.

Inorganic zinc coating shall be used within 12 hours of initial mixing.

Application of inorganic zinc coating shall conform to the provisions for applying zinc-rich coating in Section 59-2.13, "Application of Zinc-Rich Primer," of the Standard Specifications.

The single undercoat of inorganic zinc coating shall be applied to the required dry film thickness in 2 or more applications within 8 hours of the start of blast cleaning. Abrasive blast cleaned steel shall not be exposed to relative humidity exceeding 85 percent prior to application of inorganic zinc coating.

The total dry film thickness of all applications of the inorganic zinc undercoat, including the surfaces of outside existing members within the grip under bolt heads, nuts, and washers, shall be not less than 100 μm nor more than 200 μm , except that the total dry film thickness on each faying (contact) surface of high strength bolted connections shall be between 25 μm and the maximum allowable dry film thickness for Class B coatings as determined by certified testing in conformance with Appendix A of the "Specification for Structural Joints Using ASTM A325 or A490 Bolts" of the Research Council on Structural Connections (RCSC Specification). Unless otherwise stated, all inorganic zinc coatings used on faying surfaces shall meet the slip coefficient requirements for a Class B coating on blast-cleaned steel, as specified in the RCSC Specification. The Contractor shall provide results of certified testing showing the maximum allowable dry film thickness for the Class B coating from the qualifying tests for the coating chosen, and shall maintain the coating thickness on actual faying surfaces of the structure at or below this maximum allowable coating thickness.

Areas where mudcracking occurs in the inorganic zinc coating shall be blast cleaned and repainted with inorganic zinc coating to the specified thickness.

Steel surfaces coated with Type II inorganic zinc coating shall be protected from conditions that may cause the coating film to dissolve. The Contractor, at the Contractor's expense, shall repair areas where the coating has dissolved by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Dry spray, or overspray, as defined in the Steel Structures Painting Manual, Volume 1, "Good Painting Practice," of the "SSPC: The Society for Protective Coatings," shall be removed prior to application of subsequent coats or final acceptance. Removal of dry spray shall be by screening or other methods that minimize polishing of the inorganic zinc surface. The dry film

thickness of the coating after removal of dry spray shall be in conformance with the provisions for applying the single undercoat, as specified herein.

The Contractor shall test the inorganic zinc coating prior to application of finish coats. The locations of the tests will be determined by the Engineer. The Contractor shall determine the sequence of the testing operations. The testing for adhesion and hardness will be performed no sooner than 72 hours after application of the single undercoat of inorganic zinc coating. At the Contractor's expense, satisfactory access shall be provided to allow the Engineer to determine the location of the tests.

The inorganic zinc coating shall pass the following tests:

- A. The inorganic zinc coating shall have a minimum adhesion to steel of 4 MPa when measured using a self-aligning adhesion tester in conformance with the requirements in ASTM Designation: D 4541. The Engineer will select 3 locations per girder or 100 square meters of painted surface, whichever is less, for adhesion testing. If less than 100 square meters of steel is painted in a work shift, the Engineer will select 3 areas painted during the work shift for testing. If 2 or more of the locations tested fail to meet adhesion requirements, the entire area represented by the tests will be rejected. If one of the locations tested fails to meet adhesion requirements, an additional 3 locations shall be tested. Should any of the additional locations fail to meet adhesion requirements, the entire area represented by the tests will be rejected. The Contractor, at the Contractor's expense, shall repair the rejected area by blast cleaning and repainting with inorganic zinc to the specified thickness. Test locations for areas of inorganic zinc meeting adhesion testing requirements shall be repaired by application of organic zinc primer as specified in Section 91-1.04, "Materials," of the Standard Specifications to the specified minimum dry film thickness.
- B. Areas of inorganic zinc coating where finish coats are to be applied shall be tested by the Contractor for soluble salts using a Class A or B retrieval method as described in Technology Guide 15, "Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates," of the "SSPC: The Society for Protective Coatings," and cleaned so the maximum level of soluble salts does not exceed the lesser of the manufacturer's written recommendations or 10 micrograms per square centimeter. Areas of inorganic zinc coating shall be tested at the rate of 3 tests for the first 100 square meters to be painted per day and one test for each additional 100 square meters or portion thereof at locations selected by the Engineer. When less than 100 square meters of surface area is painted in a shift, at least 2 tests shall be performed. If levels of soluble salts exceed the maximum allowed by these special provisions, the entire area represented by the testing will be rejected. The Contractor shall perform additional cleaning and testing of rejected areas until soluble salt levels conform to these requirements.
- C. Prior to application of finish coats, the inorganic zinc coating shall exhibit a solid, hard, and polished metal surface when firmly scraped with the knurled edge of a quarter. Inorganic zinc coating that is powdery, soft, or does not exhibit a polished metal surface, as determined by the Engineer, shall be repaired by the Contractor, at the Contractor's expense, by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Additional Requirements for Water Borne Inorganic Zinc Primers

- A. The surface pH of the inorganic zinc primer shall be tested by wetting the surface with de-ionized water for a minimum of 15 minutes but no longer than 30 minutes and applying pH paper with a capability of measuring in increments of 0.5 pH units. At least 2 surface pH readings shall be taken for every 50 square meters or portion thereof. If less than 50 square meters of steel is coated in a single shift or day, at least 2 surface pH readings shall be taken for primer applied during that period. Application of finish coats will not be permitted until the surface pH is less than or equal to 7.
- B. Dry to solvent insolubility for water borne inorganic zinc primers shall be determined in conformance with the requirements in ASTM Designation: D 4752, except that water shall be the solvent. The resistance rating shall be not less than 4. Areas of inorganic zinc coating shall be tested for solvent insolubility at the rate of one test per 50 square meters or portion thereof. Inorganic zinc coating represented by the tested area that does not meet the solvent insolubility requirements will be rejected. The Contractor, at the Contractor's expense, shall repair rejected areas by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Additional Requirements for Solvent Borne Inorganic Zinc Primers

- A. Dry to solvent insolubility for solvent borne inorganic zinc primers shall be determined in conformance with the requirements in ASTM Designation: D 4752. The resistance rating shall be not less than 4. Areas of inorganic zinc coating shall be tested for solvent insolubility at the rate of one test per 50 square meters or portion thereof. Inorganic zinc coating represented by the tested area that does not meet the solvent insolubility requirements will be rejected. The Contractor, at the Contractor's expense, shall repair rejected areas by blast cleaning and repainting with inorganic zinc coating to the specified thickness.
- B. Surface hardness of solvent borne inorganic zinc shall be a minimum 2H when measured in conformance with the requirements in ASTM Designation: D 3363. Areas of inorganic zinc coating shall be tested at the rate of one test per 50 square meters or portion thereof. Inorganic zinc coating that fails to meet the surface hardness requirements shall be repaired by the Contractor, at the Contractor's expense, by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

The Contractor, at the Contractor's expense, shall retest all rejected areas of inorganic zinc coating after repairs have been completed.

All areas of inorganic zinc coating shall be water rinsed in conformance with the requirements in Section 59-1.03, "Application," of the Standard Specifications and these special provisions. Areas of the coating removed by water rinsing shall be reapplied in conformance with the provisions for applying zinc-rich coating in Section 59-2.13, "Application of Zinc-Rich Primer," of the Standard Specifications and these special provisions. Except as approved by the Engineer, a minimum time of 72 hours shall be allowed between application of inorganic zinc coating and water rinsing.

Exposed area of inorganic zinc coating shall receive a minimum of 2 finish coats of an exterior grade latex paint supplied by the manufacturer of the inorganic zinc coating.

The first finish coat shall be applied within 48 hours following water rinsing and passing the soluble salt testing requirements herein.

The finish coat paint shall be formulated for application to inorganic zinc coating, shall meet the requirements for SSPC-Paint 24, "Latex Semi-Gloss Exterior Topcoat," of the "SSPC: The Society for Protective Coatings," and shall conform to the following:

- A. No visible color change in the finish coats shall occur when tested in conformance with the requirements of ASTM Designation: G 53 using FS 40 UV-B bulbs for a minimum of 38 cycles. The cycle shall be 4 hours of ultraviolet (UV) exposure at 60°C and 4 hours of condensate exposure at 40°C.
- B. The vehicle shall be an acrylic or modified acrylic copolymer with a minimum of necessary additives.

The first finish coat shall be applied in 2 applications. The first application shall consist of a spray applied mist application. The second application shall be applied after the mist application has dried to a set to touch condition as determined by the procedure described in Section 7 of ASTM Designation: D1640. The total dry film thickness of both applications of the first finish coat shall be not less than 50 µm.

Except as approved by the Engineer, a minimum drying time of 12 hours shall be allowed between finish coats.

The second finish coat color shall match Federal Standard 595B, No. 24491. The total dry film thickness of the applications of the second finish coat shall be not less than 50 µm.

The 2 finish coats shall be applied in 3 or more applications to a total dry film thickness of not less than 100 µm nor more than 200 µm.

The total dry film thickness of all applications of inorganic zinc coating and finish coat paint shall be not less than 200 µm nor more than 350 µm.

PAYMENT

Full compensation for water rinsing shall be considered as included in the contract price paid per kilogram for furnish sign structure of the type involved and no additional compensation will be allowed therefor.

Full compensation for conforming to the requirements in SSPC-QP 1, SSPC-QP 2, and SSPC-QP 3 of the "SSPC: The Society for Protective Coatings" shall be considered as included in the contract lump sum price paid per kilogram for furnish sign structure of the type involved, and no additional compensation will be allowed therefor.

PAINT GALVANIZED SURFACES

Galvanized steel surfaces shall be prepared and painted in conformance with Section 56-1.05, "Surface Finish," and Section 59-3, "Painting Galvanized Surfaces," of the Standard Specifications and these special provisions.

Galvanized steel surfaces shall receive a minimum of 2 finish coats of paint conforming to the provisions for finish coat paint on ungalvanized surfaces in "Clean and Paint Ungalvanized Surfaces" of these special provisions.

Paint shall be applied to galvanized steel surfaces to the thicknesses and in conformance with the provisions for finish coats on ungalvanized surfaces in "Clean and Paint Ungalvanized Surfaces" of these special provisions.

The total dry film thickness of all applications on galvanized steel surfaces shall be not less than 100 µm nor more than 200 µm, except that the total dry film thickness on each contact surface of high strength bolted connections shall be between 25 µm and 100 µm and may be applied in one application.

10-1.84 ROADSIDE SIGNS

Roadside signs shall be furnished and installed at the locations shown on the plans or where designated by the Engineer and in conformance with the provisions in Section 56-2, "Roadside Signs," of the Standard Specifications and these special provisions.

The Contractor shall furnish roadside sign panels in conformance with the provisions in "Furnish Sign" of these special provisions.

Wood posts shall be pressure treated after fabrication in conformance with the provisions in Section 58, "Preservative Treatment of Lumber, Timber and Piling," of the Standard Specifications and AWP A Use Category System: UC4A, Commodity Specification A or B. Type N, Type P, and Type R marker panels mounted on a post with a roadside sign shall be considered to be sign panels and will not be paid for as markers.

10-1.85 FURNISH SIGN

Signs shall be fabricated and furnished in accordance with details shown on the plans, the Traffic Sign Specifications, and these special provisions.

Traffic Sign Specifications for California sign codes are available for review at:

<http://www.dot.ca.gov/hq/traffops/signtech/signdel/specs.htm>

Traffic Sign Specifications for signs referenced with Federal MUTCD sign codes can be found in Standard Highway Signs Book, administered by the Federal Highway Administration, which is available for review at:

http://mutcd.fhwa.dot.gov/ser-shs_millennium.htm

Information on cross-referencing California sign codes with the Federal MUTCD sign codes is available at:

<http://www.dot.ca.gov/hq/traffops/signtech/signdel/specs.htm>

Temporary or permanent signs shall be free from blemishes that may affect the serviceability and detract from the general sign color and appearance when viewing during daytime and nighttime from a distance of 8 m. The face of each finished sign shall be uniform, flat, smooth, and free of defects, scratches, wrinkles, gel, hard spots, streaks, extrusion marks, and air bubbles. The front, back, and edges of the sign panels shall be free of router chatter marks, burns, sharp edges, loose rivets, delaminated skins, excessive adhesive over spray and aluminum marks.

QUALITY CONTROL FOR SIGNS

The requirements of "Quality Control for Signs" in this section shall not apply to construction area signs.

No later than 14 days before sign fabrication, the Contractor shall submit a written copy of the quality control plan for signs to the Engineer for review. The Engineer will have 10 days to review the quality control plan. Sign fabrication shall not begin until the Engineer approves the Contractor's quality control plan in writing. The Contractor shall submit to the Engineer at least

3 copies of the approved quality control plan. The quality control plan shall include, but not be limited to the following requirements:

- A. Identification of the party responsible for quality control of signs,
- B. Basis of acceptance for incoming raw materials at the fabrication facility,
- C. Type, method and frequency of quality control testing at the fabrication facility,
- D. List (by manufacturer and product name) of process colors, protective overlay film, retroreflective sheeting and black non-reflective film,
- E. Recommended cleaning procedure for each product, and
- F. Method of packaging, transport and storage for signs.

No legend shall be installed at the project site. Legend shall include letters, numerals, tildes, bars, arrows, route shields, symbols, logos, borders, artwork, and miscellaneous characters. The style, font, size, and spacing of the legend shall conform to the Standard Alphabets published in the FHWA Standard Highway Signs Book. The legend shall be oriented in the same direction in accordance with the manufacturer's orientation marks found on the retroreflective sheeting.

On multiple panel signs, legend shall be placed across joints without affecting the size, shape, spacing, and appearance of the legend. Background and legend shall be wrapped around interior edges of formed panel signs as shown on plans to prevent delamination.

The following notation shall be placed on the lower right side of the back of each sign where the notation will not be blocked by the sign post or frame:

- A. PROPERTY OF STATE OF CALIFORNIA,
- B. Name of the sign manufacturer,
- C. Month and year of fabrication,
- D. Type of retroreflective sheeting, and
- E. Manufacturer's identification and lot number of retroreflective sheeting.

The above notation shall be applied directly to the aluminum sign panels in 6-mm upper case letters and numerals by die-stamp and applied by similar method to the fiberglass reinforced plastic signs. Painting, screening, or engraving the notation will not be allowed. The notation shall be applied without damaging the finish of the sign.

Signs with a protective overlay film shall be marked with a dot of 10 mm diameter. The dot placed on white border shall be black, while the dot placed on black border shall be white. The dot shall be placed on the lower border of the sign before application of the protective overlay film and shall not be placed over the legend and bolt holes. The application method and exact location of the dot shall be determined by the manufacturer of the signs.

For sign panels that have a minor dimension of 1220 mm or less, no splice will be allowed in the retroreflective sheet except for the splice produced during the manufacturing of the retroreflective sheeting. For sign panels that have a minor dimension greater than 1220 mm, only one horizontal splice will be allowed in the retroreflective sheeting.

Unless specified by the manufacturer of the retroreflective sheeting, splices in retroreflective sheeting shall overlap by a minimum of 25 mm. Splices shall not be placed within 50 mm from edges of the panels. Except at the horizontal borders, the splices shall overlap in the direction from top to bottom of the sign to prevent moisture penetration. The retroreflective sheeting at the overlap shall not exhibit a color difference under the incident and reflected light.

Signs exhibiting a significant color difference between daytime and nighttime shall be replaced immediately.

Repairing sign panels will not be allowed except when approved by the Engineer.

The Department will inspect signs at the Contractor's facility and delivery location, and in accordance with Section 6, "Control of Materials," of the Standard Specifications. The Engineer will inspect signs for damage and defects before and after installation.

Regardless of kind, size, type, or whether delivered by the Contractor or by a common carrier, signs shall be protected by thorough wrapping, tarping, or other methods to ensure that signs are not damaged by weather conditions and during transit. Signs shall be dry during transit and shipped on pallets, in crates, or tier racks. Padding and protective materials shall be placed between signs as appropriate. Finished sign panels shall be transported and stored by method that protects the face of signs from damage. The Contractor shall replace wet, damaged, and defective signs.

Signs shall be stored in dry environment at all times. Signs shall not rest directly on the ground or become wet during storage. Signs, whether stored indoor or outdoor, shall be free standing. In areas of high heat and humidity signs shall be stored in enclosed climate-controlled trailers or containers. Signs shall be stored indoor if duration of the storage will exceed 30 days.

Screen processed signs shall be protected, transported and stored as recommended by the manufacturer of the retroreflective sheeting.

When requested, the Contractor shall provide the Engineer test samples of signs and materials used at various stages of production. Sign samples shall be 300 mm x 300 mm in size with applied background, letter or numeral, and border strip.

The Contractor shall assume the costs and responsibilities resulting from the use of patented materials, equipment, devices, and processes for the Contractor's work.

SHEET ALUMINUM

Alloy and temper designations for sheet aluminum shall be in accordance with ASTM Designation: B209.

The Contractor shall furnish the Engineer a Certificate of Compliance in accordance to Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for the sheet aluminum.

Sheet aluminum shall be pretreated in accordance to ASTM Designation: B449. Surface of the sheet aluminum shall be cleaned, deoxidized, and coated with a light and tightly adherent chromate conversion coating free of powdery residue. The conversion coating shall be Class 2 with a mass between 108 mg/m² and 377 mg/m², and an average mass of 269 mg/m². Following the cleaning and coating process, the sheet aluminum shall be protected from exposure to grease, oils, dust, and contaminants.

Sheet aluminum shall be free of buckles, warps, dents, cockles, burrs, and defects resulting from fabrication.

Base plate for standard route marker shall be die cut.

RETROREFLECTIVE SHEETING

The contractor shall furnish retroreflective sheeting for sign background and legend in accordance with ASTM Designation: D4956 and "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Retroreflective sheeting shall be applied to sign panels as recommended by the retroreflective sheeting manufacturer without stretching, tearing, and damage.

Class 1, 3, or 4 adhesive backing shall be used for Type II, III, IV, VII, VIII, and IX retroreflective sheeting. Class 2 adhesive backing may also be used for Type II retroreflective sheeting. The adhesive backing shall be pressure sensitive and fungus resistant.

When the color of the retroreflective sheeting determined from instrumental testing is in dispute, the Engineer's visual test will govern.

PROCESS COLOR AND FILM

The Contractor shall furnish and apply screened process color, non-reflective opaque black film, and protective overlay film of the type, kind, and product that are approved by the manufacturer of the retroreflective sheeting.

The Contractor shall furnish the Engineer a Certificate of Compliance in accordance to Section 6-1.07, "Certificates of Compliance," of the Standard Specifications for the screened process color, non-reflective opaque black film, and protective overlay film.

The surface of the screened process color shall be flat and smooth. When the screened process colors determined from the instrumental testing in accordance to ASTM Designation: D4956 are in dispute, the Engineer's visual test will govern.

The Contractor shall provide patterns, layouts, and set-ups necessary for the screened process.

The Contractor may use green, red, blue, and brown reverse-screened process colors for background and non-reflective opaque black film or black screened process color for legend. The coefficient of retroreflection for reverse-screened process colors on white retroreflective sheeting shall not be less than 70 percent of the coefficient of retroreflection specified in ASTM Designation: D4956.

The screened process colors and non-reflective opaque black film shall have the same outdoor weatherability as that of the retroreflective sheeting.

After curing, screened process colors shall withstand removal when tested by applying 3M Company Scotch Brand Cellophane Tape No. 600 or equivalent tape over the color and removing with one quick motion at 90° angle.

SINGLE SHEET ALUMINUM SIGN

Single Sheet aluminum signs shall be fabricated and furnished with or without frame. The Contractor shall furnish the sheet aluminum in accordance to "Sheet Aluminum" of these special provisions. Single sheet aluminum signs shall be fabricated from sheet aluminum alloy 6061-T6 or 5052-H38.

Single Sheet aluminum signs shall not have a vertical splice in the sheet aluminum. For signs with depth greater than 1220 mm, one horizontal splice will be allowed in the sheet aluminum.

Framing for single sheet aluminum sign shall consist of aluminum channel or rectangular aluminum tubing. The framing shall have a length tolerance of +3 mm. The face sheet shall be affixed to the frame with rivets of 5-mm diameter. Rivets shall be placed within the web of channels and shall not be placed less than 13 mm from edges of the sign panels. Rivets shall be made of aluminum alloy 5052 and shall be anodized or treated with conversion coating to prevent corrosion. The exposed portion of rivets on the face of signs shall be the same color as the background or legend where the rivets are placed.

Finished signs shall be flat within a tolerance of +3 mm per meter when measured across the plane of the sign in all directions. The finished signs shall have an overall tolerance within +3 mm of the detailed dimensions.

Aluminum channels or rectangular aluminum tubings shall be welded together with the inert gas shielded-arc welding process using E4043 aluminum electrode filler wires as shown on the plans. Width of the filler shall be equal to wall thickness of smallest welded channel or tubing.

FIBERGLASS REINFORCED PLASTIC PANEL SIGN

The contractor shall furnish fiberglass reinforced plastic panel sign in accordance with ASTM Designation: D3841 and "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

Fiberglass reinforced plastic shall be acrylic modified and ultraviolet stabilized for outdoor weatherability. The plastic shall contain additives designed to suppress fire ignition and flame propagation. When tested in accordance with the requirements in the ASTM Designation: D635, the extent of burning shall not exceed 25 mm.

Fiberglass reinforced plastic shall be stabilized to prevent the release solvents and monomers. The front and back surfaces of the laminate shall be clean and free of constituents and releasing agents that can interfere with the bonding of retroreflective sheeting.

The fiberglass reinforced plastic panel sign shall be weather resistant Grade II thermoset polyester laminate.

The fiberglass reinforced plastic panels shall be minimum 3.4 mm thick. Finished fiberglass reinforced plastic panel signs shall be flat within a tolerance of +3 mm per meter when measured across the plane of the sign in all directions. The finished signs shall have an overall tolerance within +3 mm of the specified dimensions.

Color of fiberglass reinforced plastic panels shall be uniform gray within Munsel range of N7.5 to N8.5.

Fiberglass reinforced plastic panels shall be cut from a single piece of laminate. Bolt holes shall be predrilled. The predrilled bolt holes, panel edges, and the front and back surfaces of the panels shall be true and smooth. The panel surfaces shall be free of visible cracks, pinholes, foreign inclusions, warping and wrinkles that can affect performance and serviceability.

LAMINATED PANEL SIGN

Laminated panel signs shall consist of two sheet aluminum laminated to a honeycomb core and extruded aluminum frame to produce flat and rigid panels of 25.4-mm or 63.5-mm nominal thickness.

The face of laminated panel signs shall be fabricated from sheet aluminum alloy 6061-T6 or 5052-H32 of 1.6-mm thickness. The back of laminated panel signs shall be fabricated from sheet aluminum alloy 3003-H14 of 1.0-mm thickness. The Contractor shall furnish sheet aluminum as provided in "Sheet Aluminum" of these special provisions.

The core material shall be phenolic impregnated kraft paper honeycomb and fungus resistant in accordance to Military Specification MIL-D-5272. The honeycomb cell size shall be 13 mm. Weight of the kraft paper shall be 300 g/m² and impregnated minimum 18 percent by weight.

A laminating adhesive that can produce a resilient oil and water-resistant bond shall be used to adhere the extruded aluminum frame and the honeycomb core to the sheet aluminum. Edge and interior delamination occur when a 0.25-mm thick feeler gauge of 13 mm in length can be

inserted into a depth of more than 13 mm between the extruded aluminum frame and the sheet aluminum. Laminated panel sign with delamination will be rejected.

Laminated panels shall be able to resist a wind load of 161 kg/m² for the following simple span lengths with a bending safety factor of 1.25:

Panel Type	Nominal Panel Thickness	Simple Span Length
A	25.4 mm	2.7 m
B	25.4 mm	2.7 m
	63.5 mm	4.42 m
H	63.5 mm	4.42 m

The tensile strength of laminated panels shall be at least 138 kPa when tested in accordance with the following modification and with ASTM Designations: C297 and C481, Cycle B after aging. Instead of spraying with hot water, the specimen shall be totally immersed in 70°C hot water. When requested by the Engineer or the Transportation Laboratory, at least one test sample of 300 mm x 300 mm in size shall be taken for every 186 m² of the panel production cycle or of the total factory production order, whichever occurs first.

Rivets used to secure the sheet aluminum to the perimeter frame shall be fabricated from aluminum alloy 5052 and anodized or treated with a conversion coating to prevent corrosion. Size of the aluminum rivets shall be 5 mm in diameter and placed at the corners of the laminated panels. Color of the exposed portion of the rivets shall be the same color as the sign background or legend on which the rivets are placed. Rivets or stainless steel screws shall be placed in holes drilled during fabrication in the perimeter frame.

On laminated multiple panel signs, a closure H-Section shall be placed in the top channel of the bottom panel. Perimeter frame of adjoining panel shall accommodate the closure H-Section in the closed position.

For signs with a depth of 1524 mm or less, the laminated panels shall be fabricated with no horizontal joints, splices or seams. For signs with a depth of greater than 1524 mm, the laminated panels may be fabricated in two panels.

The face of laminated panels shall be flat with a tolerance of +8 mm per meter when measured across the plane of each panel in all directions. Where laminated panels adjoin, the gap between adjoining edges from one corner to the other corner shall not deviate by more than 1 mm. Non-adjoining edges from one corner to the other corner shall not deviate by more than 3 mm from a straight plane. The front and back sheet aluminum shall be flush with the perimeter frame. The panel edges shall be smooth.

Laminated panel signs shall be within +3 mm or -13 mm of the detailed dimensions. The difference in length between adjoining panels of multiple panel signs shall not be greater than 13 mm.

Roadside laminated panel signs shall be Type B . Type B panels shall have a nominal thickness of 25.4 mm or 63.5 mm.

The perimeter frame of Type B panels shall consist of extruded channel edges. The interior and exterior sides of the channels, except the sides touching the face and back sheet aluminum, shall be welded at the joint. Sealant shall be placed at the corners of the perimeter frame to prevent moisture penetration.

Each side of the vertical tube spacers of Type B panels shall be welded to the perimeter frame, except the sides touching the front and back sheet aluminum.

The perimeter frame of Type H panels shall consist of extruded channel edges on the vertical sides and consist of extruded tube channel edges on the horizontal sides. The perimeter frame shall be connected by self-tapping hex head stainless steel screws. Sealant shall be placed at the corners of the perimeter frame to prevent moisture penetration.

For Type H panels with a length of 5182 mm or longer, centerline panel tube shall be placed along the horizontal centerline of the panel. The ends of the centerline panel tube shall be firmly affixed to the perimeter frame.

Each side of the vertical tube spacers of Type H panels shall be welded to the perimeter frame and the centerline panel tube, except the sides touching the front and back sheet aluminum.

The Contractor shall furnish mounting hardware for roadside laminated panel signs, such as closure H-sections, lags, bolts, nuts, and washers.

Overhead laminated panel signs shall be Type A and have a nominal thickness of 25.4 mm.

For overhead laminated signs with a length of 7315 mm or less, the laminated panels shall be fabricated with no vertical joints, splices or seams. For signs with a length of greater than 7315 mm, the length of each adjoining panel shall be as determined by the Engineer or as shown on the plans.

The perimeter frame of Type A overhead laminated panels shall be connected by self-tapping hex head stainless steel screws. Sealant shall be placed at the corners of the perimeter frame to prevent moisture penetration. The perimeter frame of Type A panels shall consist of extruded channel edges on the vertical sides and consist of modified "H" section extrusion on the horizontal sides. The modified "H" section extrusion acts as an integral retainer track for affixing the bolts to provide blind fastening of panels to the structure support.

The Contractor shall furnish mounting hardware for overhead laminated panel signs, such as closure H-sections, clamps, bolts, nuts, and washers. The clamps shall be cast aluminum alloy with a minimum tensile strength of 170 MPa. Bolt torque used for installing clamps shall not exceed 12 N-m.

FORMED PANEL SIGN

Formed panel signs shall be fabricated from one continuous sheet aluminum alloy 5052-H32 of 1.6-mm thickness. The Contractor shall furnish sheet aluminum as provided in "Sheet Aluminum" of these special provisions.

The aluminum frame shall be affixed to the panel with aluminum rivets through the face of the sign panels. Color of the exposed portion of the rivets shall be the same color as the sign background or legend on which the rivets are placed.

The face of finished formed panel sign shall be flat with a tolerance of 10 mm per meter when measured across the plane of each panel in all directions.

The Contractor shall furnish mounting hardware for roadside and overhead formed panel signs. Hardware for the overhead formed panel signs shall include bolts, nuts, and washers.

The length and depth of the overhead formed panel signs shall be within ± 2 mm of the detailed dimension.

The formed edges of the overhead panel signs shall be square. The mounting holes shall be straight and perpendicular to the front and back surfaces of the formed edges at the spacing shown on the plans. Holes that are improperly spaced and placed at the wrong angle will be rejected.

MEASUREMENT AND PAYMENT

Furnishing signs (except for construction area signs) will be measured by the square meter and the quantity to be paid for will be the total area, in square meters, of the sign panel types installed in place.

The contract price paid per square meter for furnish sign of the types specified in the Engineer's estimate shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in fabricating and furnishing the signs, , as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

Full compensation for furnishing and installing protective overlay on signs shall be considered as included in the contract price paid per square meter for furnish sign of the various types and no separate payment will be made therefor.

10-1.86 CLEAN AND PAINT STRUCTURAL STEEL

New metal surfaces shall be cleaned and painted in conformance with the provisions in Section 59-2, "Painting Structural Steel," Section 59-3, "Painting Galvanized Surfaces," and Section 91, "Paint," of the Standard Specifications and these special provisions.

GENERAL

Before performing any painting or paint removal, the Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 3 copies of a separate Painting Quality Work Plan (PQWP) for each item of work for which painting or paint removal is to be performed. As a minimum, each PQWP shall include the following:

- A. The name of each Contractor or subcontractor to be used.
 - B. One copy each of all current ASTM and "SSPC: The Society for Protective Coatings" specifications or qualification procedures applicable to the painting or paint removal to be performed. These documents shall become the permanent property of the Department.
 - C. A copy of the coating manufacturer's guidelines and recommendations for surface preparation, painting, drying, curing, handling, shipping, and storage of painted structural steel, including testing methods and maximum allowable levels for soluble salts.
 - D. Proposed materials, methods, and equipment to be used for any paint application.
 - E. Proof of each of any required certifications, SSPC-QP 1, SSPC-QP 2, SSPC-QP 3. Where SSPC-QP 3 certification is required, an enclosed shop facility shall be required. Certification of AISC Sophisticated Paint Endorsement Quality Program, P-1 Enclosed endorsement, will be considered equivalent to SSPC-QP 3.
1. In lieu of certification in conformance with the requirements in SSPC-QP 1 for this project, the Contractor may submit written documentation showing conformance with the requirements in Section 3, "General Qualification Requirements," of SSPC-QP 1.
- F. Proposed methods to control environmental conditions in accordance with the manufacturer's recommendations and these special provisions.
 - G. Proposed methods to protect the coating during curing, shipping, handling, and storage.
 - H. Proposed rinse water collection plan.

- I. A detailed paint repair plan for the repair of damaged areas.
- J. Procedures for containing blast media and water during application of coatings and coating repair of erected steel.
- K. Examples of proposed daily reports for all testing to be performed, including type of testing, location, lot size, time, weather conditions, test personnel, and results.

Before submitting the PQWP, a prepainting meeting between the Engineer, the Contractor, and a representative from each entity performing painting for this project shall be held to discuss the requirements for the PQWP.

The Engineer shall have 20 days to review the PQWP submittal after a complete plan has been received. No painting or paint removal shall be performed until the PQWP for that work is approved by the Engineer. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the PQWP, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

The Engineer's approval of the Contractor's PQWP shall not relieve the Contractor of any responsibility under the contract for the successful completion of the work in conformity with the requirements of the plans and specifications.

The Contractor shall provide enclosures to permit cleaning and painting during inclement weather. Provisions shall be made to control atmospheric conditions inside the enclosures within specified limits during cleaning and painting operations, drying to solvent insolubility, and throughout the curing period in accordance with the manufacturer's recommendations and these special provisions. Full compensation for providing and maintaining such enclosures shall be considered as included in the prices paid for the various contract items of work requiring paint and no additional compensation will be allowed therefor.

Fresh, potable water with a maximum chloride content of 75 mg/L and a maximum sulfate content of 200 mg/L shall be used for water rinsing or pressure washing operations. No continuous recycling of rinse water will be permitted. If rinse water is collected into a tank and subsequent testing determines the collected water conforms to the specified requirements, reuse may be permitted by the Engineer if no collected water is added to the tank after sample collection for determination of conformance to specified requirements.

CLEANING

New metal surfaces, except where galvanized, shall be dry blast cleaned in conformance with the requirements in SSPC-SP 10, "Near White Blast Cleaning," of the "SSPC: The Society for Protective Coatings." Blast cleaning shall leave surfaces with a dense, uniform, angular anchor pattern of not less than 40 μm nor more than 86 μm as measured in conformance with the requirements in ASTM Designation: D 4417.

Mineral and slag abrasives used for blast cleaning steel surfaces shall conform to the requirements for Class A, Grade 2 to 3 abrasives contained in SSPC-AB 1, "Mineral and Slag Abrasives," of the "SSPC: The Society for Protective Coatings," and shall not contain hazardous material.

Steel abrasives used for blast cleaning steel surfaces shall comply with the requirements of SSPC-AB 3, "Ferrous Metallic Abrasive," of the "SSPC: The Society for Protective Coatings." If steel abrasive is recycled through shop or field abrasive blast cleaning units, the recycled abrasive shall conform to the requirements of SSPC-AB 2, "Specification for Cleanliness of Recycled Ferrous Metallic Abrasive," of the "SSPC: The Society for Protective Coatings."

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications and a Material Safety Data Sheet shall be furnished before use for each shipment of blast cleaning material for steel.

Abrasive blast cleaned surfaces shall be tested by the Contractor for soluble salts using a Class A or B retrieval method as described in Technology Guide 15, "Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates," of the "SSPC: The Society for Protective Coatings," and cleaned so the maximum level of soluble salts does not exceed the lesser of the coating manufacturer's written recommendations or 10 micrograms per square centimeter. Areas of abrasive blast cleaned steel shall be tested at the rate of 3 tests for the first 100 square meters prepared per day, and one test for each additional 100 square meters or portion thereof, at locations selected by the Engineer. When less than 100 square meters of surface area is prepared in a shift, at least 2 tests shall be performed. If levels of soluble salts exceed the maximum allowed by these special provisions, the entire area represented by the testing will be rejected. The Contractor shall perform additional cleaning and testing of rejected areas until soluble salt levels conform to these requirements.

Corners shall be chamfered to remove sharp edges.

Thermal cut edges (TCEs) to be painted shall be conditioned before blast cleaning by shallow grinding or other method approved by the Engineer to remove the thin, hardened layer of material resulting from resolidification during cooling.

Visually evident base metal surface irregularities and defects shall be removed in accordance with ASTM Designation: A 6 or AASHTO Designation: M 160 before blast cleaning steel. When material defects exposed by blast cleaning are removed, the blast profile shall be restored by either blast cleaning or by using mechanical tools in accordance with SSPC-SP 11, "Power Tool Cleaning to Bare Metal," of the "SSPC: The Society for Protective Coatings."

PAINTING

Blast cleaned surfaces shall receive a single undercoat, and a final coat where specified, consisting of an inorganic zinc coating conforming to the requirements in AASHTO Designation: M 300, Type I or Type II, except that: 1) the first 3 sentences of Section 5.6, "Primer Field Performance Requirements," shall not apply for Type II coatings, and 2) the entire Section 5.6.1 shall not apply for either type of inorganic zinc coating.

If the Contractor proposes to use a Type I coating, the Contractor shall furnish to the Engineer for review documentation as required in Section 5.6 of AASHTO Designation: M 300. The Contractor shall allow the Engineer 30 days to review the proposal. Type I coatings selected for use shall meet the current applicable volatile organic compound limits for the air quality district in which the project is located.

If the Contractor proposes to use a Type II coating, the coating shall be selected from the qualified products list, which may be obtained from the Transportation Laboratory.

The color of the final application of inorganic zinc coating shall match Federal Standard 595B No. 36373.

Inorganic zinc coating shall be used within 12 hours of initial mixing.

Application of inorganic zinc coating shall conform to the provisions for applying zinc-rich coating in Section 59-2.13, "Application of Zinc-Rich Primer," of the Standard Specifications.

The single undercoat of inorganic zinc coating shall be applied to the required dry film thickness in 2 or more applications within 8 hours of the start of blast cleaning. Abrasive blast cleaned steel shall not be exposed to relative humidity exceeding 85 percent before application of inorganic zinc coating.

The total dry film thickness of all applications of the inorganic zinc undercoat, including the surfaces of outside existing members within the grip under bolt heads, nuts, and washers, shall be not less than 100 μm nor more than 200 μm , except that the total dry film thickness on each faying (contact) surface of high strength bolted connections shall be between 25 μm and the maximum allowable dry film thickness for Class B coatings as determined by certified testing in conformance with Appendix A of the "Specification for Structural Joints Using ASTM A325 or A490 Bolts" of the Research Council on Structural Connections (RCSC Specification). Unless otherwise stated, all inorganic zinc coatings used on faying surfaces shall meet the slip coefficient requirements for a Class B coating on blast-cleaned steel, as specified in the RCSC Specification. The Contractor shall provide results of certified testing showing the maximum allowable dry film thickness for the Class B coating from the qualifying tests for the coating chosen, and shall maintain the coating thickness on actual faying surfaces of the structure at or below this maximum allowable coating thickness.

Areas where mudcracking occurs in the inorganic zinc coating shall be blast cleaned and repainted with inorganic zinc coating to the specified thickness.

Steel surfaces coated with Type II inorganic zinc coating shall be protected from conditions that may cause the coating film to dissolve. The Contractor, at the Contractor's expense, shall repair areas where the coating has dissolved by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Dry spray, or overspray, as defined in the Steel Structures Painting Manual, Volume 1, "Good Painting Practice," of the "SSPC: The Society for Protective Coatings," shall be removed before application of subsequent coats or final acceptance. Removal of dry spray shall be by screening or other methods that minimize polishing of the inorganic zinc surface. The dry film thickness of the coating after removal of dry spray shall be in conformance with the provisions for applying the single undercoat, as specified herein.

The Contractor shall test the inorganic zinc coating before application of final coats. The locations of the tests will be determined by the Engineer. The Contractor shall determine the sequence of the testing operations. The testing for adhesion and hardness shall be performed no sooner than 72 hours after application of the single undercoat of inorganic zinc coating. Satisfactory access shall be provided to allow the Engineer to determine the location of the tests.

The inorganic zinc coating shall pass the following tests:

- A. The inorganic zinc coating shall have a minimum adhesion to steel of 4 MPa when measured using a self-aligning adhesion tester in conformance with the requirements in ASTM Designation: D 4541. The Engineer will select 3 locations per girder or 100 square meters of painted surface, whichever is less, for adhesion testing. If less than 100 square meters of steel is painted in a work shift, the Engineer will select 3 areas painted during the work shift for testing. If 2 or more of the locations tested fail to meet adhesion requirements, the entire area represented by the tests will be rejected. If one of the locations tested fails to meet adhesion requirements, an additional 3 locations shall be tested. Should any of the additional locations fail to meet adhesion requirements, the entire area represented by the tests will be rejected. The Contractor, at the Contractor's expense, shall repair the rejected area by blast cleaning and repainting with inorganic zinc to the specified thickness. Test locations for areas of inorganic zinc meeting adhesion testing requirements shall be repaired by application of organic zinc primer as specified in Section 91-1.04, "Materials," of the Standard Specifications to the specified minimum dry film thickness.
- B. Areas of inorganic zinc coating where finish coats are to be applied shall be tested by the Contractor for soluble salts using a Class A or B retrieval method as described in

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- Technology Guide 15, "Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates," of the "SSPC: The Society for Protective Coatings," and cleaned so the maximum level of soluble salts does not exceed the lesser of the manufacturer's written recommendations or 10 micrograms per square centimeter. Areas of inorganic zinc coating shall be tested at the rate of 3 tests for the first 100 square meters to be painted per day and one test for each additional 100 square meters or portion thereof at locations selected by the Engineer. When less than 100 square meters of surface area is painted in a shift, at least 2 tests shall be performed. If levels of soluble salts exceed the maximum allowed by these special provisions, the entire area represented by the testing will be rejected. The Contractor shall perform additional cleaning and testing of rejected areas until soluble salt levels conform to these requirements.
- C. Before application of final coats, the inorganic zinc coating shall exhibit a solid, hard, and polished metal surface when firmly scraped with the knurled edge of a quarter. Inorganic zinc coating that is powdery, soft, or does not exhibit a polished metal surface, as determined by the Engineer, shall be repaired by the Contractor, at the Contractor's expense, by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Additional Requirements for Water Borne Inorganic Zinc Primers

- A. The surface pH of the inorganic zinc primer shall be tested by wetting the surface with de-ionized water for a minimum of 15 minutes but no longer than 30 minutes and applying pH paper with a capability of measuring in increments of 0.5 pH units. At least 2 surface pH readings shall be taken for every 50 square meters or portion thereof. If less than 50 square meters of steel is coated in a single shift or day, at least 2 surface pH readings shall be taken for primer applied during that period. Application of finish coats will not be permitted until the surface pH is less than or equal to 7.
- B. Dry to solvent insolubility for water borne inorganic zinc primers shall be determined in conformance with the requirements in ASTM Designation: D 4752, except that water shall be the solvent. The resistance rating shall be not less than 4. Areas of inorganic zinc coating shall be tested for solvent insolubility at the rate of one test per 50 square meters or portion thereof. Inorganic zinc coating represented by the tested area that does not meet the solvent insolubility requirements will be rejected. The Contractor, at the Contractor's expense, shall repair rejected areas by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Additional Requirements for Solvent Borne Inorganic Zinc Primers

- A. Dry to solvent insolubility for solvent borne inorganic zinc primers shall be determined in conformance with the requirements in ASTM Designation: D 4752. The resistance rating shall be not less than 4. Areas of inorganic zinc coating shall be tested for solvent insolubility at the rate of one test per 50 square meters or portion thereof. Inorganic zinc coating represented by the tested area that does not meet the solvent insolubility requirements will be rejected. The Contractor, at the Contractor's expense, shall repair rejected areas by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

- B. Surface hardness of solvent borne inorganic zinc shall be a minimum 2H when measured in conformance with the requirements in ASTM Designation: D 3363. Areas of inorganic zinc coating shall be tested at the rate of one test per 50 square meters or portion thereof. Inorganic zinc coating that fails to meet the surface hardness requirements shall be repaired by the Contractor, at the Contractor's expense, by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

The Contractor, at the Contractor's expense, shall retest all rejected areas of inorganic zinc coating after repairs have been completed.

The exterior surfaces of undercoated areas of the web, stiffeners, and flanges, except under surfaces of bottom flanges, of girders shall receive a final coat of an inorganic zinc coating of the same product used in the single undercoat.

The final coat of inorganic zinc coating shall be applied after testing and completion of all operations that may damage or discolor the steel surface, including correction of runs, sags, thin and excessively thick areas in the paint film, skips and holidays, dry spray, or areas of non-uniform appearance.

The area to receive the final coat of inorganic zinc coating shall be lightly roughened by abrasive blasting using an abrasive no larger than 600 μm . Abrasive blasting shall remove no more than 15 μm of inorganic zinc. The surface to be lightly roughened shall be free from moisture, dust, grease, or deleterious material. The undercoated areas of the under surfaces of bottom flanges shall be protected from abrasive blast cleaning operations.

The final coat of inorganic zinc coating shall be applied to the required dry film thickness in one uniform application within 24 hours after light roughening. The dry film thickness of the final coat shall be not less than 25 μm nor more than 75 μm .

Except at bolted connections, the total dry film thickness of all applications of the single undercoat and final coat of inorganic zinc coating shall be not less than 125 μm nor more than 275 μm .

Finish coats will not be required.

10-1.87 PREPARE AND PAINT CONCRETE BARRIER SURFACES

All exposed surfaces of concrete median barriers, including median barriers on bridge decks shall be prepared and painted in conformance with , the provisions in Section 59, "Painting," and Section 91, "Paint," of the Standard Specifications, and these special provisions.

The paint shall be light sable, alkali resistant, acrylic latex or acrylic latex copolymer emulsion, commercially manufactured for use as an exterior concrete coating. Paint color shall conform to Sherwin Williams "Barstow/ Victorville Caltrans Brown #1" Prior to painting the concrete median barrier a 1 by 1 meter painted test panel shall be submitted to the Engineer for written approval. If ordered by the Engineer, additional test panels shall be constructed and finished until the color panel is approved by the Engineer.

If more than 3 tests panels are ordered by the Engineer, each additional panel shall be paid for as extra work.

After all concrete median barriers have been painted, the Contractor shall deliver not less than 15 liters of the same barrier paint to the Engineer, in the original containers, for State use in repair of damaged barriers after acceptance of the contract

Full compensation for preparing and painting concrete median barriers, including up to 3 test panels and additional paint supplied to the Engineer, shall be considered as included in the contract price paid per square meter for prepare and paint concrete barrier.

10-1.88 CLEAN AND PAINT – JOINT SEAL ASSEMBLIES AND PTFE BEARINGS

Joint seal assemblies and PTFE Bearings shall be cleaned and painted with a single coat of inorganic zinc in conformance with the provisions in Sections 59-2, "Painting Structural Steel," 59-3, "Painting Galvanized Surfaces," and 91, "Paint," of the Standard Specifications and these special provisions.

Prior to performing any painting, the Contractor shall submit to the Engineer, in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings," of the Standard Specifications, 3 copies of a separate Painting Quality Work Plan (PQWP) for each item of work for which painting is to be performed. As a minimum, each PQWP shall include the following:

- A. The name of each Contractor or subcontractor to be used.
- B. One copy each of all current ASTM and "SSPC: The Society for Protective Coatings" specifications or qualification procedures applicable to the painting or paint removal to be performed. These documents shall become the permanent property of the Department.
- C. A copy of the coating manufacturer's guidelines and recommendations for surface preparation, painting, drying, curing, handling, shipping, and storage of painted structural steel, including testing methods and maximum allowable levels for soluble salts.
- D. Proposed methods and equipment to be used for paint application.
- E. Proposed methods to control environmental conditions in accordance with the manufacturer's recommendations and these special provisions.
- F. Proposed methods to protect the coating during curing, shipping, handling, and storage.
- G. A detailed paint repair plan for the repair of damaged areas.

Certification in conformance with the requirements in SSPC-QP 1, SSPC-QP 2, and SSPC-QP 3 of the "SSPC: The Society for Protective Coatings" will not be required for cleaning and painting of joint seal assemblies and PTFE bearings.

The Engineer shall have 14 days to review the PQWP submittal after a complete plan has been received. No painting shall be performed until the PQWP for that work is approved by the Engineer. Should the Engineer fail to complete the review within this time allowance and if, in the opinion of the Engineer, the Contractor's controlling operation is delayed or interfered with by reason of the delay in reviewing the PQWP, the delay will be considered a right of way delay in conformance with the provisions in Section 8-1.09, "Right of Way Delays," of the Standard Specifications.

Fresh, potable water with a maximum chloride content of 75 mg/L and a maximum sulfate content of 200 mg/L shall be used for water rinsing or pressure washing operations. No continuous recycling of rinse water will be permitted. If rinse water is collected into a tank and subsequent testing determines the collected water conforms to the specified requirements, reuse may be permitted by the Engineer if no collected water is added to the tank after sample collection for determination of conformance to specified requirements.

Metal surfaces to be painted shall be dry blast cleaned in conformance with the requirements in SSPC-SP 10, "Near White Blast Cleaning," of the "SSPC: The Society for Protective Coatings." Blast cleaning shall leave surfaces with a dense, uniform, angular anchor pattern of not less than 40 μm nor more than 86 μm as measured in conformance with the requirements in ASTM Designation: D 4417.

Mineral and slag abrasives used for blast cleaning metal surfaces shall conform to the requirements for Class A, Grade 2 to 3 abrasives contained in SSPC-AB 1, "Mineral and Slag Abrasives," of the "SSPC: The Society for Protective Coatings," and shall not contain hazardous material.

Steel abrasives used for blast cleaning metal surfaces shall comply with the requirements of SSPC-AB 3, "Ferrous Metallic Abrasive," of the "SSPC: The Society for Protective Coatings." If steel abrasive is recycled through shop or field abrasive blast cleaning units, the recycled abrasive shall conform to the requirements of SSPC-AB 2, "Specification for Cleanliness of Recycled Ferrous Metallic Abrasive," of the "SSPC: The Society for Protective Coatings."

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications and a Material Safety Data Sheet shall be furnished prior to use for each shipment of blast cleaning material.

Abrasive blast cleaned surfaces shall be tested by the Contractor for soluble salts using a Class A or B retrieval method as described in Technology Guide 15, "Field Methods for Retrieval and Analysis of Soluble Salts on Steel and Other Nonporous Substrates," of the "SSPC: The Society for Protective Coatings," and cleaned so the maximum level of soluble salts does not exceed the lesser of the coating manufacturer's written recommendations or 10 micrograms per square centimeter. Each joint seal assembly and PTFE bearing shall be tested for soluble salts. If levels of soluble salts exceed the maximum allowed by these special provisions, the Contractor shall perform additional cleaning and testing of blast cleaned surfaces until soluble salt levels conform to these requirements.

Corners shall be chamfered to remove sharp edges.

Thermal cut edges (TCEs) to be painted shall be conditioned before blast cleaning by shallow grinding or other method approved by the Engineer to remove the thin, hardened layer of material resulting from resolidification during cooling.

Visually evident base metal surface irregularities and defects shall be removed in accordance with ASTM Designation: A 6 or AASHTO Designation: M 160 prior to blast cleaning steel. When material defects exposed by blast cleaning are removed, the blast profile shall be restored by either blast cleaning or by using mechanical tools in accordance with SSPC-SP 11, "Power Tool Cleaning to Bare Metal," of the "SSPC: The Society for Protective Coatings."

Blast cleaned surfaces shall receive a single undercoat, and a final coat where specified, consisting of an inorganic zinc coating conforming to the requirements in AASHTO Designation: M 300, Type I or Type II, except that:

1. The first 3 sentences of Section 5.6, "Primer Field Performance Requirements," shall not apply for Type II coatings, and
2. The entire Section 5.6.1 shall not apply for either type of inorganic zinc coating.

If the Contractor proposes to use a Type I coating, the Contractor shall furnish to the Engineer for review documentation as required in Section 5.6 of AASHTO Designation: M 300. The Contractor shall allow the Engineer 14 days to review the proposal.

If the Contractor proposes to use a Type II coating, the coating shall be selected from the qualified products list, which may be obtained from the Transportation Laboratory.

The color of the inorganic zinc coating shall match Federal Standard 595B, No. 36373.

Inorganic zinc coating shall be used within 12 hours of initial mixing.

Stainless steel surfaces of PTFE bearings shall be masked off completely prior to application of inorganic zinc coating.

Application of inorganic zinc coating shall conform to the provisions for applying zinc-rich coating in Section 59-2.13, "Application of Zinc-Rich Primer," of the Standard Specifications.

The single coat of inorganic zinc coating shall be applied to the required dry film thickness in 2 or more applications within 8 hours of the start of blast cleaning. Abrasive blast cleaned steel shall not be exposed to relative humidity exceeding 85 percent prior to application of inorganic zinc.

The total dry film thickness of all applications of inorganic zinc, including the surfaces of outside existing members within the grip under bolt heads, nuts, and washers, shall be not less than 100 μm nor more than 200 μm , except that the total dry film thickness on each faying (contact) surface of high strength bolted connections shall be between 25 μm and the maximum allowable dry film thickness for Class B coatings as determined by certified testing in conformance with Appendix A of the "Specification for Structural Joints Using ASTM A325 or A490 Bolts" of the Research Council on Structural Connections (RCSC Specification). Unless otherwise stated, all inorganic zinc coatings used on faying surfaces shall meet the slip coefficient requirements for a Class B coating on blast-cleaned steel, as specified in the RCSC Specification. The Contractor shall provide results of certified testing showing the maximum allowable dry film thickness for the Class B coating from the qualifying tests for the coating chosen, and shall maintain the coating thickness on actual faying surfaces of the structure at or below this maximum allowable coating thickness.

Areas where mudcracking occurs in the inorganic zinc coating shall be blast cleaned and repainted with inorganic zinc coating to the specified thickness.

Metal surfaces coated with Type II inorganic zinc coating shall be protected from conditions that may cause the coating film to dissolve. The Contractor, at the Contractor's expense, shall repair areas where the coating has dissolved by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

Dry spray, or overspray, as defined in the Steel Structures Painting Manual, Volume 1, "Good Painting Practice," of the "SSPC: The Society for Protective Coatings," shall be removed prior to application of subsequent coats or final acceptance. Removal of dry spray shall be by screening or other methods that minimize polishing of the inorganic zinc surface. The dry film thickness of the coating after removal of dry spray shall be in conformance with the provisions for applying the single undercoat, as specified herein.

The Contractor shall test the inorganic zinc coating at locations determined by the Engineer. The Contractor shall determine the sequence of the testing operations. The testing for adhesion and hardness shall be performed no sooner than 72 hours after application of the inorganic zinc coating. Satisfactory access shall be provided to allow the Engineer to determine the location of the tests.

The inorganic zinc coating shall pass the following tests:

- A. The inorganic zinc coating shall have a minimum adhesion to steel of 4 MPa when measured using a self-aligning adhesion tester in conformance with the requirements in

- ASTM Designation: D 4541. The Engineer shall select 2 locations per assembly and bearing for adhesion testing. If either of the locations tested fails to meet adhesion requirements, the assembly and bearing will be rejected. The Contractor, at the Contractor's expense, shall repair the rejected item by blast cleaning and repainting with inorganic zinc to the specified thickness. Test locations for areas of inorganic zinc meeting adhesion testing requirements shall be repaired by application of organic zinc primer as specified in Section 91-1.04, "Materials," of the Standard Specifications to the specified minimum dry film thickness.
- B. The inorganic zinc coating shall exhibit a solid, hard, and polished metal surface when firmly scraped with the knurled edge of a quarter. Inorganic zinc coating that is powdery, soft, or does not exhibit a polished metal surface shall be repaired by the Contractor, at the Contractor's expense, by blast cleaning and repainting with inorganic zinc coating to the specified thickness.
 - C. Dry to solvent insolubility for inorganic zinc primers shall be determined in conformance with the requirements in ASTM Designation: D 4752, except that water shall be the solvent used for testing of water borne inorganic zinc primers. The resistance rating shall be not less than 4. Each assembly and bearing shall be tested for dry to solvent insolubility. Inorganic zinc coating that does not meet the solvent insolubility requirements shall be repaired by the Contractor, at the Contractor's expense, by blast cleaning and repainting with inorganic zinc coating to the specified thickness.
 - D. Surface hardness of inorganic zinc shall be a minimum 2H when measured in conformance with the requirements in ASTM Designation: D 3363. Each assembly and bearing shall be tested for surface hardness. Inorganic zinc coating that fails to meet the surface hardness requirements shall be repaired by the Contractor, at the Contractor's expense, by blast cleaning and repainting with inorganic zinc coating to the specified thickness.

The Contractor, at the Contractor's expense, shall retest all rejected areas of inorganic zinc coating after repairs have been completed.

Full compensation for cleaning and painting of joint seal assemblies and PTFE bearings shall be considered as included in the contract unit price paid for joint seal assemblies and PTFE bearings, and no separate payment will be made therefor.

10-1.89 ANTI-GRAFFITI COATING

This work includes applying anti-graffiti coating to concrete surfaces.

Comply with Section 59-6, "Painting Concrete," of the Standard Specifications.

Submit manufacturer's application and removal instructions 7 days before starting work.

MATERIALS

Anti-graffiti coating must:

1. Be a nontoxic, sacrificial, nonflammable, water-based coating designed for protecting concrete from graffiti
2. Be compatible with the concrete surface treatment
3. Have a clear matte finish when dry
4. Be removable with a hot pressure washer

CONSTRUCTION

Cure new concrete surfaces under Section 90-7.03, "Curing Structures," of the Standard Specifications.

Test concrete surfaces for acceptance of coating under the manufacturer's recommendations before coating. Areas that resist accepting coating must be cleaned and retested.

Apply anti-graffiti coating under the manufacturer's recommendations in at least 2 even coats.

MEASUREMENT AND PAYMENT

The contract price paid per square meter for anti-graffiti coating includes full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and applying anti-graffiti coating to concrete surfaces, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.90 ALTERNATIVE PIPE

Alternative pipe culverts must comply with Section 62, "Alternative Culverts," of the Standard Specifications.

Full compensation for furnishing and constructing the Pipe Elbows shall be considered as included in the contract linear meter prices paid for the various sizes of Alternative Pipe and no additional compensation will be allowed therefor.

10-1.91 REINFORCED CONCRETE PIPE

Reinforced concrete pipe shall conform to the provisions in Section 65, "Reinforced Concrete Pipe," of the Standard Specifications and these special provisions.

GENERAL

Where embankment will not be placed over the top of the pipe, a relative compaction of not less than 85 percent shall be required below the pipe spring line for pipe installed using Method 1 backfill in trench, as shown on Standard Plan A62D. Where the pipe is to be placed under the traveled way, a relative compaction of not less than 90 percent shall be required unless the minimum distance between the top of the pipe and the pavement surface is the greater of 1.2 meters or one half of the outside diameter of the pipe.

Except as otherwise designated by classification on the plans or in the specifications, joints for culvert and drainage pipes shall conform to the plans or specifications for standard joints.

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MATERIALS

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The concrete for reinforced concrete pipe must contain not less than ____ kg of cementitious material per cubic meter with a water–cementitious material ratio not to exceed 0.35 by weight. Reinforcement shall have a minimum cover of ____ mm. Supplementary cementitious material is optional.

Special reinforced concrete pipe, having concrete cover over the steel reinforcement greater than the cover specified in AASHTO Designation: M 170M, shall conform to the provisions in Section 65-1.02, "Materials," and Section 65-1.02A, "Circular Reinforced Concrete Pipe," of the Standard Specifications, except the width of crack produced by the D-load test specified in AASHTO Designation: M 170M shall be the width determined by the following formula:

$$b = \frac{t - 3/8d}{t - 3/8d - C} \times 0.3 \text{ mm}$$

Where:

b = Width of crack to be produced in lieu of the 0.3-mm crack specified in AASHTO Designation: M 170M

t = Wall thickness of pipe, mm

d = Effective depth of the section to be tested, m

C = Concrete cover over steel reinforcement in excess of cover specified in AASHTO Designation: M 170M

Reinforced concrete pipe that is to be hydrostatically tested shall be strength tested by the 3-edge bearing method to a maximum D-load of 10 percent greater than the 0.3 mm cracking D-load specified in AASHTO Designation: M 170M or to the actual D-load required to produce a 0.3 mm crack, whichever is the lesser.

Special oval shaped reinforced concrete pipe, having concrete cover over the steel reinforcement greater than the cover specified in AASHTO Designation: M 207M, shall conform to the provisions in Section 65-1.02, "Materials," and Section 65-1.02B, "Oval Shaped Reinforced Concrete Pipe," of the Standard Specifications, except the width of crack produced by the D-load test specified in AASHTO Designation: M 207M shall be the width determined by the following formula:

$$b = \frac{t - 3/8d}{t - 3/8d - C} \times 0.3 \text{ mm}$$

Where:

b = Width of crack to be produced in lieu of the 0.3-mm crack specified in AASHTO Designation: M 207M

t = Wall thickness of pipe, mm

d = Effective depth of the section to be tested, m

C = Concrete cover over steel reinforcement in excess of cover specified in AASHTO Designation: M 207

Oval shaped reinforced concrete pipe that is to be hydrostatically tested shall be strength tested by the 3-edge bearing method to a maximum D-load of 10 percent greater than the 0.3 mm cracking D-load specified in AASHTO Designation: M 207M or to the actual D-load required to produce a 0.3 mm crack, whichever is the lesser.

MEASUREMENT AND PAYMENT

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10-1.92 CORRUGATED METAL PIPE

Corrugated metal & steel culverts shall conform to the provisions in Section 66, "Corrugated Metal Pipe," of the Standard Specifications and these special provisions.

Asphaltic mastic coating or polymeric sheet coating substituted for bituminous coating shall be placed on the outside and inside surfaces of the pipe.

Corrugated steel pipe shall be fabricated from zinc-coated steel sheet.

10-1.93 MISCELLANEOUS FACILITIES

Precast Concrete Manholes, Inlets, and Flared End Sections shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications.

10-1.94 DRAINAGE INLET MARKER

The Contractor shall furnish and install plastic, thermoplastic, or stamped drainage inlet markers in conformance with the details and locations shown on the plans, as specified in these special provisions, and as directed by the Engineer.

If allowed in the plans, drainage inlet markers shall be either thermoplastic, or stamped at the option of the Contractor. Once a type is selected, the type of drainage inlet marker shall not be changed without written approval from the Engineer.

Thermoplastic drainage inlet markers shall be prefabricated, free of lead and chromium, and conform to AASHTO Designation: M249-79 and the requirements as follow. Thermoplastic drainage inlet markers shall be adhered to the surface of the drainage inlet with adhesives or heat as recommended by the manufacturer of the marker.

Property	Specifications	Requirements
Thickness, mm		2.0 – 4.0
Legend color (non-reflective)	FHWA's Color Tolerance Chart	Blue or Green (PR Color Number 3 or 4)
Background color (non-reflective)	AASHTO Designation: M249-78	White
Skid Resistance	ASTM Designation: E-303	60 BPN

The Contractor shall mechanically clean the surface before placing thermoplastic drainage inlet markers.

The surface of drainage inlets shall be imprinted as shown on the plans with an approved stamp. The stamp shall be furnished by the Contractor. Stamped surfaces shall be free from blemishes.

Drainage inlet marker will be measured as units determined from actual count in place.

The contract unit price paid for drainage inlet marker shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing drainage inlet markers, complete in place, as shown on the plans, as specified in the Standard Specifications, and these special provisions, and as directed by the Engineer.

Full compensation for furnishing the approved stamp and for stamping drainage inlets shall be considered as included in the contract price paid per cubic meter for minor concrete (minor structure) and no separate payment will be made therefor.

10-1.95 WELDED STEEL PIPE CASING (BRIDGE)

Welded steel pipe casings through bridges and under approach slabs shall be of the size shown and shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications and these special provisions.

Unless otherwise shown on the project plans, casings shall be installed at each abutment, and casings shall be extended to the greater of: (1) 1.5 m beyond the approach slab, (2) 1.5 m beyond the end of the adjacent wingwall or (3) 6 m beyond the abutment.

WORKING DRAWINGS

Working drawings for temporary support of casing pipe at the abutments shall be submitted for approval in conformance with the provisions in Section 5-1.02, "Plans and Working Drawings" of the Standard Specifications.

MATERIALS

Casing pipe

Casing pipe shall be welded steel pipe conforming to the provisions in Section 70-1.02B, "Welded Steel Pipe," of the Standard Specifications, except that the pipe shall be treated in accordance with the following requirements, prior to shipping. Exterior surfaces of welded steel pipe shall be cleaned and coated in conformance with the requirements in ANSI/AWWA C213 or at the option of the Contractor, cleaned, primed, and coated in accordance with specifications of ANSI/AWWA C214.

Pipe wrapping tape

Wrapping tapes for pipe in contact with the ground shall be a pressure sensitive polyvinyl chloride or polyethylene tape having thickness of 1.27 mm, minimum.

CONSTRUCTION

If a blockout is provided in the bridge abutment wall for casing pipe, the space between the casing pipe and bridge abutment wall shall be filled with portland cement mortar conforming to the provisions in Section 51-1.135, "Mortar," of the Standard Specifications.

Openings for utilities through bridge superstructure concrete shall either be formed or shall consist of pipe sleeves.

Wrapping and coating pipe

Damaged coating on steel pipe casing in contact with earth shall be wrapped as follows:

- A. Pipe to be wrapped shall be thoroughly cleaned and primed as recommended by the tape manufacturer.
- B. Tapes shall be tightly applied with 1/2 uniform lap, free from wrinkles and voids to provide not less than 2.5 mm thickness.
- C. Field joints and fittings for wrapped pipe shall be covered by double wrapping 1.27 mm thick tape. Wrapping at joints shall extend a minimum of 150 mm over adjacent pipe coverings. Width of tape for wrapping fittings shall not exceed 50 mm. Adequate tension shall be applied so tape will conform closely to contours of joint.

Where a welded steel pipe casing passes through the abutment wall, the welded steel pipe casing shall be additionally wrapped with 2 layers of No. 15 asphalt-felt building paper, securely taped or wired in place.

MEASUREMENT AND PAYMENT

Measurement and payment for welded steel pipe casing for each size listed in the Engineers Estimate shall conform to the provisions in Sections 70-1.04, "Measurement," and 70-1.05, "Payment," of the Standard Specifications.

Full compensation for furnishing and installing mortar and building paper, and casing shall be considered as included in the contract prices paid per meter for the sizes of welded steel pipe casing involved and no additional compensation will be allowed therefor.

10-1.96 WELDED STEEL PIPE

Welded steel pipe shall conform to the provisions in Section 70, "Miscellaneous Facilities," of the Standard Specifications and these special provisions.

Coating and wrapping will not be required.

Coating the interior surface of the pipe will not be required.

Wrapping will not be required.

The exterior of the pipe shall be double coated and double wrapped in conformance with the requirements in AWWA Designation: C 203.

Full compensation for furnishing and constructing the 200mm steel pipe elbow shall be considered as included in the contract linear meter prices paid for 200 mm Welded Steel Pipe (3.4mm Thick) and no additional compensation will be allowed therefor.

10-1.97 SLOPE PROTECTION

Slope protection shall be placed or constructed in conformance with the provisions in Section 72, "Slope Protection," of the Standard Specifications.

Rock slope protection fabric must be Class B.

10-1.98 SLOPE PAVING (CONCRETE) (ROCK BLANKET)

Slopes under the ends of bridges, where shown on the plans, shall be paved in conformance with the provisions in Section 72-6, "Slope Paving," of the Standard Specifications and these special provisions.

The slope paving shall be colored in conformance with the provisions in Section 72-6.03, "Materials," of the Standard Specifications.

Prior to placing the permanent slope paving, the Contractor shall construct a test panel at least 1.2 m by 1.8 m at the site for approval by the Engineer. The test panel shall be constructed of the same materials as are proposed for the permanent work and shall be finished and cured as specified for the permanent work. Additional test panes shall be constructed as necessary until a panel is produced which conforms to the requirements herein, before constructing other slope paving.

The rock shall conform to the grading and quality requirements for rock in Section 72-5 "Concrete-Rocked Slope Protection," of the Standard Specifications and these special provisions. The Contractor shall submit a sample of rocks for approval by the Engineer a minimum of 15 working days prior to placing the rock blanket surface of slope paving.

The rocks shall be placed on a setting bed of mortar. The cement mortar bedding shall conform to the following:

Portland cement shall conform to the requirements in Section 90-2.01, "Portland Cement," of the Standard Specifications.

Hydrated lime shall conform to ASTM Designation: C 207, Type S.

Mortar for laying the rocks shall consist, by volume, of one part portland cement, 0 to ½ parts of hydrated lime, and 2 ¼ to 3 parts of mortar sand. Sufficient water shall be added to make a workable mortar. Each batch of mortar shall be accurately measured and thoroughly mixed. Mortar shall be freshly mixed as required. Mortar shall not be retempered more than one hour after mixing. The amount of lime shall be reduced as necessary to prevent leaching and efflorescence on finished surfaces.

A proprietary, premixed packaged blend of cement, lime, and sand, without color, that requires only water to prepare for use as brick mortar or grout may be furnished for mortar. Packages of premix shall bear the manufacturer's name, brand, weight, and color identification. The manufacturer's recommended mixing proportions and procedures shall be furnished to the Engineer.

The surface of the reinforced concrete base shall be lightly and evenly scored horizontally and vertically with metal scratcher having grooves not more than one inch apart.

Rocks shall be laid and embedded in a mortar setting bed approximately 76 mm thick. Embedment shall be shoved tight so that the mortar is flushed into the joints to a depth of approximately 25 mm.

Surfaces of completed masonry, concrete, and other such materials exposed to view shall be protected from spillage, splatters and other deposits of cementitious materials from masonry construction. All such deposits shall be removed without damage to the materials or exposed surfaces. Stains, efflorescence, laitance, splashes or spots on the faces of masonry exposed to view shall be removed. Cleaning agents shall conform to the concrete paver manufacturers recommendations. Cleaning agents shall be applied to a sample area acceptable to the Engineer, and their performance and the cleaning methods approved by the Engineer before proceeding with cleaning beyond the sample area.

Space remaining between placed rocks shall not exceed 40 mm unless otherwise approved by the Engineer.

After completion of placing rocks on any 3-meter strip, no load shall be permitted on the surface for a period of at least 24 hours, or longer if so ordered by the Engineer.

Slope paving (concrete) (rock blanket) will be measured by the square meter. The area to be paid for will be calculated from the lengths, and widths.

Concrete for curbs integral with slope paving and joint seals specified on the plans will be paid for at the contract price per square meter for slope paving (concrete) (rock blanket) and no separate payment will be made therefor.

The location of construction joints shall be subject to the approval of the Engineer. Placement of slope paving shall be scheduled so that the work, including placement, finishing, and application of curing, is completed in any section bounded by permissible construction joints on the same day that the work is started in that section.

Areas of slope paving (concrete) (rock blanket) shown on the plans to have a grooved finish shall be scored by dragging a finishing tool over the struck-off surface or by any other means which will result in a surface conforming to the details shown on the plans.

10-1.99 MISCELLANEOUS CONCRETE CONSTRUCTION

Concrete curb, gutter, sidewalk, curb ramps, and junction structures shall conform to the provisions in Section 73, "Concrete Curbs and Sidewalks," of the Standard Specifications and these special provisions.

Curb ramps at Baseline Street OC (Replace) shall conform to the provisions in "Miscellaneous Concrete Construction" of these special provisions.

Miscellaneous metal at curb ramps at Baseline Street OC (Replace) as shown on the plans shall conform to the provisions in Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

Drill and bond dowels at curb ramps at Baseline Street OC (Replace) as shown on the plans shall conform to the provisions in "Drill and bond dowels" of these special provisions.

Curb ramp detectable warning surface shall consist of raised truncated domes constructed or installed on curb ramps in conformance with the details shown on the plans and these special provisions. The detectable warning surface shall be cast-in-place of the curb ramp. The color of the detectable warning surface shall be yellow conforming to Federal Standard 595B, Color No. 33538.

Cast-in-place detectable warning surfaces shall be painted in conformance with the provisions in Section 59-6, "Painting Concrete," of the Standard Specifications.

The finished surfaces of the detectable warning surface shall be free from blemishes.

Prior to constructing the cast-in-place detectable warning surface, the Contractor shall demonstrate the ability to produce a detectable warning surface conforming to the details shown on the plans and these special provisions by constructing a 600-mm by 600-mm {24-inch by 24-inch} test panel.

Full compensation for constructing or furnishing and installing curb ramp detectable warning surfaces shall be considered as included in the contract price paid per cubic meter for minor concrete (miscellaneous construction) and no separate payment will be made therefor.

Full compensation for curb ramps at Baseline Street OC (Replace) including all labor, materials (including miscellaneous metal, drill and bond dowels and detectable warning surface for anchoring curb ramps to bridge deck), tools, equipments, and incidentals, and for doing all work involved in constructing curb ramps shall be considered as included in the contract price paid per meter for concrete barrier (Type 26 modified) listed in the Engineer's Estimate and no separate payment will be made therefor.

10-1.100 MISCELLANEOUS IRON AND STEEL

Miscellaneous iron and steel shall conform to the provisions in Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

Full compensation for furnishing and constructing the Vertical Drop Connector, 200mm Elbow, 200mm Wye, Cleanouts, Grated Line Drain, and Safety Cage and CMP shall be considered as included in the contract kilogram prices paid for Miscellaneous Iron and Steel and no additional compensation will be allowed therefor.

10-1.101 MISCELLANEOUS METAL (BRIDGE)

Miscellaneous metal (bridge) shall conform to the provisions for miscellaneous bridge metal in Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

Attention is directed to "Welding" of these special provisions.

Miscellaneous metal (bridge) shall consist of the miscellaneous bridge metal items listed in Section 75-1.03, "Miscellaneous Bridge Metal," of the Standard Specifications, and the following:

- A. Pin Assembly
- B. Steel Plates at Curb Ramp

10-1.102 BRIDGE DECK DRAINAGE SYSTEM

Bridge deck drainage systems shall conform to the provisions for miscellaneous bridge metal in Section 75, "Miscellaneous Metal," of the Standard Specifications and these special provisions.

Self-tapping screws used for sleeve connections shall be hex-head stainless steel, installed in holes drilled to fit the self-tapping screws, conforming to the requirements of ASTM Designation: A 276, Type 304.

At the Contractor's option, fiberglass pipes and fittings with the same diameter and minimum bend radius as those shown on the plans, may be substituted for welded steel pipe in deck drain systems.

Fiberglass pipe and fittings shall conform to the requirements in ASTM Designation: D 2996, and shall have a minimum short-term rupture strength of 207 MPa. The adhesive type recommended by the manufacturer shall be used for joining pipe and fittings. Fiberglass pipe not enclosed in a box girder cell or encased in concrete shall be manufactured from ultraviolet-resistant resin pigmented with concrete-gray color, or be coated with a concrete-gray resin-rich exterior coating. Paint shall not be used. Fiberglass pipe treated with ultraviolet protection shall withstand a minimum of 2500 hours of accelerated weathering when tested in conformance with the requirements in ASTM Designation: G 154. Lamps shall be UV-B (313 nm wavelength). The resting cycle shall be 4 hours of ultraviolet exposure at 60°C, and then 4 hours of condensate exposure at 50°C. After testing, the surface of the pipe shall exhibit no fiber exposure, crazing, or checking, and only a slight chalking or color change.

Support spacing for fiberglass pipe shall be the same as shown on the plans for welded steel pipe. Pipe supports shall have a width of not less than 38 mm.

A Certificate of Compliance for fiberglass pipe and fittings shall be furnished to the Engineer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance shall include all laboratory test results conforming to the provisions specified herein.

For drainage piping NPS 8 or smaller, which is: (1) enclosed in a box girder cell and exposed for a length not greater than 6 m within the cell, or (2) encased in concrete, the Contractor shall have the option of substituting polyvinyl chloride (PVC) plastic pipe and fittings, with the same diameter and minimum bend radius as shown on the plans, for welded steel pipe.

The PVC plastic pipe and fittings shall be Schedule 40 conforming to the requirements of ASTM Designations: D 1785. The maximum support spacing for PVC plastic pipe shall be 2 m.

Couplings used to connect PVC plastic pipe or fiberglass pipe to steel shall be threaded or flanged. The sleeve connections shown on the plans shall not be used for either PVC plastic pipe or fiberglass pipe.

If PVC plastic pipe or fiberglass pipe is substituted for welded steel pipe, the quantity of drainage piping will be computed on the basis of the dimensions and details shown on the plans,

and no change in the quantities to be paid for will be made because of the use of PVC plastic pipe or fiberglass pipe.

Bridge deck drainage systems will be measured and paid for by the kilogram in the same manner specified for miscellaneous metal (bridge) in Section 75-1.06, "Measurement," and Section 75-1.07, "Payment," of the Standard Specifications.

10-1.103 MISCELLANEOUS METAL (RESTRAINER-CABLE TYPE)

Miscellaneous metal (restrainer-cable type) shall conform to the provisions for bridge joint restrainer units in Section 75-1.035, "Bridge Joint Restrainer Units," of the Standard Specifications and these special provisions.

New concrete adjacent to restrainers shall be placed prior to installing restrainers.

Miscellaneous metal (restrainer-cable type) will be measured and paid for by the kilogram in the same manner specified for miscellaneous metal (restrainer) in Sections 75-1.06, "Measurement," and 75-1.07, "Payment," of the Standard Specifications.

10-1.104 CHAIN LINK FENCE

Chain link fence shall be Type CL-1.8 and shall conform to the provisions in Section 80, "Fences," of the Standard Specifications.

10-1.105 MARKERS AND DELINEATORS

Markers and delineators shall conform to the provisions in Section 82, "Markers and Delineators," of the Standard Specifications and these special provisions.

Markers and delineators on flexible posts shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. Flexible posts shall be made from a flexible white plastic which shall be resistant to impact, ultraviolet light, ozone, and hydrocarbons. Flexible posts shall resist stiffening with age and shall be free of burns, discoloration, contamination, and other objectionable marks or defects which affect appearance or serviceability.

Retroreflective sheeting for metal and flexible target plates shall be the retroreflective sheeting designated for channelizers, markers, and delineators conforming to the requirements in ASTM Designation: D 4956-95 and in conformance with the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions.

10-1.106 FLEXIBLE POST (FIBER OPTIC TRENCH DELINEATOR)

Flexible post fiber optic trench delineators shall conform to the provisions in Section 82, "Markers and Delineators," of the Standard Specifications and these special provisions.

Delineators on flexible posts shall conform to the provisions in "Approved Traffic Products" of these special provisions. Flexible posts shall be made from a flexible white plastic which shall be resistant to impact, ultraviolet light, ozone, and hydrocarbons. Flexible posts shall resist stiffening with age and shall be free of burns, discoloration, contamination, and other objectionable marks or defects which affect appearance or serviceability.

Retroreflective sheeting for metal and flexible target plates shall be the retroreflective sheeting designated for channelizers, markers, and delineators conforming to the requirements in

ASTM Designation: D 4956-95 and in conformance with the provisions in "Approved Traffic Products" of these special provisions.

Flexible posts shall be installed every 150 m and at all crossings directly above fiber optic conduit (in the same trench) offset enough to not hit the warning tape. Posts shall not be placed in front of pull boxes.

If fiber optic conduit is installed under a paved shoulder, the flexible posts shall be installed in the dirt shoulder, immediately adjacent to the paved shoulder. The message on the post shall indicate (in meters) the distance it is offset from the fiber optic conduit.

The flexible post may be installed by placing it into the trench prior to backfilling and compacting, or by placing it into a 457 mm steel anchor sleeve that is driven into the ground prior to installing the flexible post. The flexible post and anchor shall have locking tabs that prevent removal of the flexible post from the anchor sleeve.

Flexible posts shall extend a maximum of 914 mm and a minimum of 122 mm above the ground, and a minimum of 457 mm and a maximum of 610 mm below the ground.

The message on the flexible post shall be black text on orange reflective background, and shall be located at the top of the post, and shall face approaching traffic. The message shall read: "WARNING, FIBER OPTIC CABLE". Below this shall be a smaller message that reads: "BEFORE EXCAVATING OR IN AN EMERGENCY CALL CALTRANS, SAN BERNARDINO, CALIFORNIA (909) 383-4427".

Full compensation for furnishing and installing the flexible post (fiber optic trench delineator) shall be considered as included in the price or prices paid for the fiber optic conduit involved and no separate payment will be made therefor.

10-1.107 METAL BEAM GUARD RAILING

Metal beam guard railing shall be constructed in conformance with the provisions in Section 83-1, "Railings," of the Standard Specifications and these special provisions.

Attention is directed to "Order of Work" of these special provisions.

Line posts shall be wood, steel, or plastic. Blocks shall be wood or plastic.

ALTERNATIVE IN-LINE TERMINAL SYSTEM

Alternative in-line terminal system shall be furnished and installed as shown on the plans and in conformance with these special provisions.

The allowable alternatives for an in-line terminal system shall consist of one of the following or a Department approved equal.

- (1) **TERMINAL SYSTEM (TYPE SKT)** - Terminal system (Type SKT) shall be a SKT 350 Sequential Kinking Terminal manufactured by Road Systems, Inc., located in Big Spring, Texas, and shall include items detailed for terminal system (Type SKT) shown on the plans. The SKT 350 Sequential Kinking Terminal can be obtained from the distributor, Universal Industrial Sales, P.O. Box 699, Pleasant Grove, UT 84062, Telephone (801) 785-0505 or from the distributor, Gregory Highway Products, 4100 13th Street, S.W., Canton, OH 44708, Telephone (330) 477-4800.

- (2) **TERMINAL SYSTEM (TYPE ET)** - Terminal system (Type ET) shall be an ET-2000 PLUS (4-tube system) extruder terminal as manufactured by Trinity Industries, Inc., and shall include items detailed for terminal system (Type ET) shown on the plans. The ET-2000 PLUS (4-tube system) extruder terminal can be obtained from the manufacturer, Trinity Industries, Inc., P.O. Box 99, 950 West 400S, Centerville, UT 84014, Telephone (800) 772-7976.

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance shall certify that the terminal systems furnished conform to the contract plans and specifications, conform to the prequalified design and material requirements, and were manufactured in conformance with the approved quality control program.

Terminal systems shall be installed in conformance with the manufacturer's installation instructions and these requirements. Each terminal system installed shall be identified by painting the type of terminal system in neat black letters and figures 60 mm high on the backside of the rail element between system posts numbers 4 and 5.

For terminal system (Type ET) the steel foundation tubes with soil plates attached shall be, at the Contractor's option, either driven, with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 100 mm thick and each layer shall be moistened and thoroughly compacted. The wood terminal posts shall be inserted into the steel foundation tubes by hand and shall not be driven. Before the wood terminal posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts shall be coated with a grease which will not melt or run at a temperature of 65°C or less. The edges of the wood terminal posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

For terminal system (Type SKT) the soil tubes shall be, at the Contractor's option, driven with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 100 mm thick and each layer shall be moistened and thoroughly compacted. Wood posts shall be inserted into the steel foundation tubes by hand. Before the wood terminal posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts shall be coated with a grease which will not melt or run at a temperature of 65°C or less. The edges of the wood posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

Surplus excavated material remaining after the terminal system has been installed shall be disposed of in a uniform manner along the adjacent roadway where designated by the Engineer.

The contract unit price paid for alternative in-line terminal system shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing alternative in-line terminal system, complete in place, including excavation, backfill and disposal of surplus material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

ALTERNATIVE FLARED TERMINAL SYSTEM

Alternative flared terminal system shall be furnished and installed as shown on the plans and in conformance with these special provisions.

The allowable alternatives for a flared terminal system shall consist of one of the following or a Department approved equal.

- (1) **TERMINAL SYSTEM (TYPE FLEAT)** - Terminal system (Type FLEAT) shall be a Flared Energy Absorbing Terminal 350 manufactured by Road Systems, Inc., located in Big Spring, Texas, and shall include items detailed for terminal system (Type FLEAT) shown on the plans. The Flared Energy Absorbing Terminal 350 can be obtained from the distributor, Universal Industrial Sales, P.O. Box 699, Pleasant Grove, UT 84062, Telephone (801) 785-0505 or from the distributor, Gregory Highway Products, 4100 13th Street, S.W., Canton, OH 44708, Telephone (330) 477-4800.
- (2) **TERMINAL SYSTEM (TYPE SRT)** - Terminal system (Type SRT) shall be an SRT-350 Slotted Rail Terminal (8-post system) as manufactured by Trinity Industries, Inc., and shall include items detailed for terminal system (Type SRT) shown on the plans. The SRT-350 Slotted Rail Terminal (8-post system) can be obtained from the manufacturer, Trinity Industries, Inc., P.O. Box 99, 950 West 400S, Centerville, UT 84014, Telephone (800) 772-7976.

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance shall certify that the terminal systems furnished conform to the contract plans and specifications, conform to the prequalified design and material requirements, and were manufactured in conformance with the approved quality control program.

Terminal systems shall be installed in conformance with the manufacturer's installation instructions and these requirements. Each terminal system installed shall be identified by painting the type of terminal system in neat black letters and figures 60 mm high on the backside of the rail element between system posts numbers 4 and 5.

For terminal system (Type SRT), the steel foundation tubes with soil plates attached shall be, at the Contractor's option, either driven, with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 100 mm thick and each layer shall be moistened and thoroughly compacted. The wood terminal posts shall be inserted into the steel foundation tubes by hand and shall not be driven. Before the wood terminal posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts shall be coated with a grease which will not melt or run at a temperature of 65°C or less. The edges of the wood terminal posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

For terminal system (Type FLEAT), the soil tubes shall be, at the Contractor's option, driven with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 100 mm thick and each layer shall be moistened and thoroughly compacted. Wood posts shall be inserted into the steel foundation tubes by hand. Before the wood terminal posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts shall be coated with a grease which will not melt or run at a temperature of 65°C or less. The edges of the wood posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

Surplus excavated material remaining after the terminal system has been installed shall be disposed of in a uniform manner along the adjacent roadway where designated by the Engineer.

The contract unit price paid for alternative flared terminal system shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing

all the work involved in furnishing and installing alternative flared terminal system, complete in place, including excavation, backfill and disposal of surplus material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.108 CHAIN LINK RAILING

Chain link railing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications.

10-1.109 TUBULAR HANDRAILING

Tubular handrailing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications.

10-1.110 CABLE RAILING

Cable railing shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications.

10-1.111 CONCRETE BARRIER

Concrete barriers shall conform to the provisions in Section 83-2, "Barriers," of the Standard Specifications and these special provisions.

The provisions of the third paragraph in Section 83-2.02D(4), "Finishing," of the Standard Specifications shall not apply.

Concrete barrier markers shall conform to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions. At those locations shown on the plans, concrete barrier markers shall be cemented to the barrier in conformance with the manufacturer's recommendations. Full compensation for furnishing and placing concrete barrier markers shall be considered as included in the contract linear meter prices paid for Concrete Barrier of various types and no additional compensation will be allowed therefor.

10-1.112 TRANSITION RAILING (TYPE WB)

Transition railing (Type WB) shall be furnished and installed in conformance with details shown on the plans, the provisions in Section 83-2, "Barriers," of the Standard Specifications and these special provisions.

The 10-gage rail elements shall conform to the requirements of Class B, Type 1 three beam guard railing as shown in AASHTO Designation: M 180. End caps shall conform to the requirements of Class A, Type 1 three beam guard railing as shown in AASHTO Designation: M 180.

Surplus excavated material remaining after the transitional railing (Type WB) has been constructed shall be disposed of in a uniform manner along the adjacent roadway where designated by the Engineer.

The contract unit price paid for transition railing (Type WB) shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work

involved in furnishing and installing transition railing (Type WB), complete in place, including drilling holes for wood posts, driving posts, backfill, and disposal of surplus material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.113 CRASH CUSHION (TYPE CAT)

Crash cushion (Type CAT) and crash cushion (Type CAT) backup shall be furnished and installed as shown on the plans and in conformance with these special provisions.

Crash cushion (Type CAT) shall be a CAT-350 Crash Cushion Attenuating Terminal as manufactured by Trinity Industries, Inc., and shall include all the items detailed for crash cushion (Type CAT) shown on the plans.

Crash cushion (Type CAT) backup shall consist of items detailed for crash cushion (Type CAT) backup shown on the plans and shall conform to the provisions in Section 83-1.02B, "Metal Beam Guard Railing," of the Standard Specifications.

Excluding the crash cushion (Type CAT) backup, arrangements have been made to ensure that any successful bidder can obtain the CAT-350 Crash Cushion Attenuating Terminal from the manufacturer, Trinity Industries, Inc., P.O. Box 99, 950 West 400S, Centerville, UT 84014, Telephone 1-800-772-7976. The price quoted by the manufacturer for the CAT-350 Crash Cushion Attenuating Terminal, FOB Centerville, Utah is \$3500, not including sales tax.

The above price will be firm for orders placed on or before June 1, 2009, provided delivery is accepted within 90 days after the order is placed.

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance shall certify that crash cushion (Type CAT) conforms with the contract plans and specifications, conforms to the prequalified design and material requirements, and was manufactured in conformance with the approved quality control program.

The crash cushion (Type CAT) shall be installed in conformance with the manufacturer's installation instructions and these requirements. The steel foundation tubes with soil plates attached, shall be, at the Contractor's option, either driven, with or without pilot holes, or placed in drilled holes. Space around the steel foundation tubes shall be backfilled with selected earth, free of rock, placed in layers approximately 100 mm thick and each layer shall be moistened and thoroughly compacted. Wood posts shall be inserted into the steel foundation tubes by hand. Before the wood posts are inserted, the inside surfaces of the steel foundation tubes to receive the wood posts shall be coated with a grease which will not melt or run at a temperature of 65°C or less. The edges of the wood posts may be slightly rounded to facilitate insertion of the post into the steel foundation tubes.

Surplus excavated material remaining after the crash cushion (Type CAT) and backup have been constructed shall be disposed of in a uniform manner along the adjacent roadway where designated by the Engineer.

Crash cushion (Type CAT) and crash cushion (Type CAT) backup will be measured as units determined from actual count in place in the completed work.

The contract unit prices paid for crash cushion (Type CAT) and for crash cushion (Type CAT) backup shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing crash cushion (Type CAT) and crash cushion (Type CAT) backup, complete in place, including

excavation, backfill, and disposal of surplus material, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.114 CRASH CUSHION (REACT 9SCBS and REACT 9CBB)

Crash cushion (REACT 9SCBS and REACT 9CBB) shall be furnished and installed as shown on the plans and in conformance with the provisions in the Standard Specifications and these special provisions.

Crash cushion (REACT 9SCBS and REACT 9CBB) shall be a multiple recoverable type, manufactured by Energy Absorption Systems, Inc. Crash cushion (REACT 9SCBS and REACT 9CBB) and additional components shall conform to the descriptions as follows:

Contract Item Description	Manufacturer's Product Description
Crash Cushion (REACT 9SCBS)	REACT 350.9 Self Contained
Crash Cushion (REACT 9CBB)	REACT 350.9 Concrete Side Mount

The successful bidder can obtain from the following distributors the crash cushion (REACT) manufactured by Energy Absorption Systems, Inc. at 35 East Wacker Drive, Suite 1100, Chicago, IL 60601:

1. Northern California: Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA 95828, telephone (800) 884-8274, FAX (916) 387-9734
2. Southern California: Traffic Control Service, Inc., 1818 E. Orangethorpe, Fullerton, CA 92831-5324, telephone (800) 222-8274, FAX (714) 526-9501

The price quoted by the manufacturer for Crash Cushion (REACT 9CBB), FOB Pell City, Alabama is \$50,000, not including sales tax. The price quoted by the manufacturer for Crash Cushion (REACT 9SCBS), FOB Pell City, Alabama is \$55,000, not including sales tax.

The above prices will be firm for orders placed within 30 days of contract award, and provided delivery is accepted within 90 days after the order is placed.

The price quoted for crash cushion (REACT 9SCBS) includes the concrete anchorage devices, but does not include the concrete anchor slab or the W-Beam connection to the barrier.

The price quoted for crash cushion (REACT 9CBB) includes the concrete anchorage devices, but does not include the concrete anchor slab or the concrete backup block.

Crash cushion shall be installed in conformance with the manufacturer's recommendations.

Concrete anchorage devices used for attaching the crash cushion to the base slab shall be limited to those which have been provided by the manufacturer.

The concrete anchor slab and backup block shall conform to the provisions in Section 51, "Concrete Structures," and Section 52, "Reinforcement," of the Standard Specifications and these special provisions.

The concrete anchor slab and backup block shall be constructed of concrete containing not less than 350 kg of cementitious material per cubic meter.

For crash cushion (REACT 9SCBS), W-Beam connections to the barrier shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications. The high strength bolts and nuts for W-Beam connections to the barrier shall conform to the requirements in ASTM Designation: A 325/A 325M and A 563/A 563M, respectively.

The Contractor shall furnish the Engineer one copy of the manufacturer's plan and parts list for each model installed.

The Contractor shall provide the Engineer with a Certificate of Compliance from the manufacturer in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications. The Certificate of Compliance shall certify that crash cushion conforms with the contract plans and specifications, and conforms to the prequalified design and material requirements.

Crash cushion will be measured by the unit as determined from actual count in place in the completed work.

The contract unit prices paid for crash cushion (REACT 9SCBS) shall include full compensation for furnishing all labor, materials (including anchor bolts, nuts, washers, and marker panels), tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing the crash cushions, complete in place, including structure excavation, structure backfill, concrete anchor slab with bar reinforcing steel, transition plate and W-beam connector, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract unit prices paid for crash cushion (REACT 9CBB) shall include full compensation for furnishing all labor, materials (including anchor bolts, nuts, washers, and marker panels), tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing the crash cushions, complete in place, including structure excavation, structure backfill, and concrete anchor slab and backup block with bar reinforcing steel, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.115 QUADGUARD SYSTEM

Quadguard systems shall be furnished and installed as shown on the plans, and as specified in the Standard Specifications and these special provisions.

QS2406G Excluding the foundation pad, arrangements have been made to insure that any successful bidder can obtain the Model QS9006 from the following source:

- A. Manufacturer: Energy Absorption Systems, Inc. 35 East Wacker Drive Chicago, IL. 60601-2076 Telephone (312) 467-1256.
- B. Distributors:
 - 1. Traffic Control Service, Inc., 1155 W. La Cadena Drive, Riverside, CA. 92501, Telephone (951) 683-7575.
 - 2. Traffic Control Service, Inc., 1881 Betmor Lane, Anaheim, CA. 92805, Telephone (714) 937-0422.
 - 3. Traffic Control Service, Inc., 23925 San Fernando Road, Newhall, CA. 91321, Telephone (661) 255-8733.
 - 4. Traffic Control Service, Inc., 8585 Thys Court, Sacramento, CA. 95828, Telephone (916) 387-9733.

QS2406G

A Type R marker panel shall be attached to the front of the quadguard system as shown on the plans. The marker panel shall be firmly fastened to the quadguard system with commercial quality hardware or by other methods approved by the Engineer.

The W-Beam connections to barrier shall conform to the provisions in Section 83-1, "Railings," of the Standard Specifications.

High strength bolts and nuts for W-Beam connections to barrier shall conform to the requirements in ASTM Designation: A 325 or A 325M and A 563 or A 563M, respectively.

Quadguard system will be measured by the unit as determined from actual count in place in the completed work.

The contract unit price paid for quadguard system shall include full compensation for furnishing all labor, materials (including anchor bolts, nuts, washers, and marker panels), tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing the quadguard system, complete in place, including structure excavation, structure backfill, bar reinforcing steel, concrete for backup block and anchor slab, concrete pad, transition panel, W-beam connector, and for furnishing high strength bolts and plate washers, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.116 THERMOPLASTIC PAVEMENT MARKING

Thermoplastic pavement markings shall be applied in conformance with the provisions in Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

Thermoplastic material shall be free of lead and chromium, and shall conform to the requirements in State Specification PTH-02ALKYD.

Retroreflectivity of the thermoplastic pavement markings shall conform to the requirements in ASTM Designation: D 6359-99. White thermoplastic pavement markings shall have a minimum initial retroreflectivity of $250 \text{ mcd} \cdot \text{m}^{-2} \cdot \text{lx}^{-1}$. Yellow thermoplastic pavement markings shall have a minimum initial retroreflectivity of $150 \text{ mcd} \cdot \text{m}^{-2} \cdot \text{lx}^{-1}$.

Thermoplastic pavement markings shall be free of runs, bubbles, craters, drag marks, stretch marks, and debris.

At the option of the Contractor, permanent pavement marking tape conforming to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions may be placed instead of the thermoplastic pavement markings specified herein. Permanent tape, if used, shall be installed in conformance with the manufacturer's specifications.

If permanent tape is placed instead of thermoplastic pavement markings, the tape will be measured and paid for by the square meter as thermoplastic pavement marking.

10-1.117 THERMOPLASTIC TRAFFIC STRIPE (SPRAYABLE)

Sprayable thermoplastic traffic stripes (traffic lines) shall be applied in conformance with the provisions in Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

Sprayable thermoplastic material shall be free of lead and chromium, and shall conform to the requirements in State Specification No. PTH-02SPRAY.

Retroreflectivity of the sprayable traffic stripes shall conform to the requirements in ASTM Designation: D 6359-99. White sprayable thermoplastic traffic stripes shall have a minimum initial retroreflectivity of $250 \text{ mcd}\cdot\text{m}^{-2}\cdot\text{lx}^{-1}$. Yellow sprayable thermoplastic traffic stripes shall have a minimum initial retroreflectivity of $150 \text{ mcd}\cdot\text{m}^{-2}\cdot\text{lx}^{-1}$.

At the option of the Contractor, permanent traffic striping and pavement marking tape conforming to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions may be placed instead of the sprayable thermoplastic traffic stripes. Permanent tape, if used, shall be installed in conformance with the manufacturer's specifications.

Where striping joins existing striping, as shown on the plans, the Contractor shall begin and end the transition from the existing striping pattern into or from the new striping pattern a sufficient distance to ensure continuity of the striping pattern.

Sprayable thermoplastic material shall be applied to the pavement at a minimum thickness of one millimeter and a minimum rate of 0.2-kg/m. The minimum application rate is based on a solid stripe of 100 mm in width.

Sprayable thermoplastic material shall be applied to the pavement at a temperature between 177°C and 205°C, unless a different temperature is recommended by the manufacturer.

Sprayable thermoplastic traffic stripes shall be free of runs, bubbles, craters, drag marks, stretch marks, and debris.

If permanent tape is placed instead of sprayable thermoplastic traffic stripes, the tape will be measured and paid for by the meter as thermoplastic traffic stripe (sprayable).

Sprayable thermoplastic traffic stripes will be measured by the meter along the line of the traffic stripes, without deductions for gaps in broken traffic stripes. A double traffic stripe, consisting of two 100-mm wide yellow stripes, will be measured as one traffic stripe.

The contract price paid per meter for thermoplastic traffic stripe (sprayable) shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in applying sprayable thermoplastic traffic stripes (regardless of the number, widths, and patterns of individual stripes involved in each traffic stripe) including establishing alignment for stripes, and layout work, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-1.118 PAINT TRAFFIC STRIPE AND PAVEMENT MARKING

Painted pavement markings shall be applied in conformance with the provisions in Section 84, "Traffic Stripes and Pavement Markings," of the Standard Specifications and these special provisions.

Pavement marking paint shall conform to the requirements in State Specification No. PTWB-01.

The color of the painted pavement markings shall conform to the requirements in ASTM Designation: D 6628-01.

Retroreflectivity of the paint pavement markings shall conform to the requirements in ASTM Designation: D 6359-99. White painted pavement markings shall have a minimum initial

retroreflectivity of $250 \text{ mcd}\cdot\text{m}^{-2}\cdot\text{lx}^{-1}$. Yellow painted pavement markings shall have a minimum initial retroreflectivity of $150 \text{ mcd}\cdot\text{m}^{-2}\cdot\text{lx}^{-1}$.

At the option of the Contractor, permanent pavement marking tape conforming to the provisions in "Prequalified and Tested Signing and Delineation Materials" of these special provisions may be placed instead of painted pavement markings. Permanent tape, if used, shall be placed in conformance with the manufacturer's specifications.

If permanent tape is placed instead of painted pavement markings, the tape will be measured and paid for by the square meter as paint pavement marking of the number of coats designated in the Engineer's Estimate.

10-1.119 PAVEMENT MARKERS

Pavement markers shall be placed in conformance with the provisions in Section 85, "Pavement Markers," of the Standard Specifications and these special provisions.

The Contractor shall furnish the Engineer certificates of compliance for the pavement markers in conformance with the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

Retroreflective pavement markers shall be marked as abrasion resistant on the body of the markers.

SECTION 10-2 HIGHWAY PLANTING AND IRRIGATION SYSTEMS

10-2.01 GENERAL

The work performed in connection with highway planting and irrigation systems shall conform to the provisions in Section 20, "Erosion Control and Highway Planting," of the Standard Specifications and these special provisions.

10-2.02 (BLANK)

10-2.03 (BLANK)

10-2.04 (BLANK)

10-2.05 IRRIGATION SYSTEMS

Irrigation systems shall be furnished and installed in conformance with the provisions in Section 20-5, "Irrigation Systems," of the Standard Specifications, except materials containing asbestos fibers shall not be used.

PIPE

Steel Pipe.

Galvanized steel pipe supply lines installed between water meters and backflow preventer assemblies shall be installed not less than _460_ mm below finished grade, measured to the top of the pipe

Plastic Pipe

WATER METER

Water meters for the irrigation systems will be furnished and installed by the serving utility at the locations shown on the plans.

The City of San Bernardino Water Department has established a fee of \$25,000.00 and \$45,000.00 for furnishing and installing a 40 mm and 50 mm water meter, respectively. If, at the time of installation, this fee has been changed, the State will take a credit for the reduction in the fee, or the State will pay the difference for the increase in the fee. The credit or payment will be taken or paid on the first monthly progress payment made after the meter is installed. The Contractor shall furnish the Engineer with a copy of the invoice for the installation fee.

The quantity of water meters will be measured by the unit as determined from actual count in place.

The contract unit price paid for 40 mm and 50 mm water meter shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing water meters, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer

BACKFLOW PREVENTER ASSEMBLIES

Backflow preventers shall conform to the provisions in Section 20-2.25, "Backflow Preventers," of the Standard Specifications and these special provisions.

Backflow preventers shall have current approval from the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research (USC Foundation).

Before backflow preventer assembly installation, the Contractor shall provide the Engineer with the portion of the USC Foundation "List of Approved Backflow Prevention Assemblies" showing type of assembly, manufacturer's name, model number, edition of the manual under which the assembly was approved, approval date and the last renewal date.

The "List of Approved Backflow Prevention Assemblies" is available to Foundation Members. Membership information to join the USC Foundation is available at:

<http://www.usc.edu/dept/fccchr/membership.html>

Questions concerning the USC Foundation "List of Approved Backflow Prevention Assemblies" can be answered by calling the Foundation at toll free (866) 545-6340.

Pressure loss through the backflow preventers shall not exceed the following:

BACKFLOW PREVENTER SIZE (millimeters)	FLOW RATE (Liters per minute)	PRESSURE LOSS (kPa)
40	151	82
50	270	82

Steel supply line between the water meter and backflow preventer shall be galvanized and shall be one size larger than the backflow preventer.

Backflow preventer assemblies shall be painted with a minimum of 2 applications of a commercial quality enamel paint. The color of the paint shall be light brown.

When backflow preventer assembly enclosures are specified, the portland cement concrete pads for the enclosures will be paid for in conformance to the provisions in "Backflow Preventer Assembly Enclosures" of these special provisions.

BACKFLOW PREVENTER ASSEMBLY ENCLOSURE

Enclosures shall be fabricated of structural steel angles and flattened expanded metal and shall be installed over backflow preventer assemblies on a portland cement concrete pad as shown on the plans and in conformance with these special provisions.

Expanded metal for sides, ends and top panels shall be fabricated from 1.9 mm (14-gage), minimum thickness, sheet steel. The flattened expanded metal openings shall be approximately 20 mm by 45 mm in size.

Expanded metal panels shall be attached to the steel frames by a series of welds, not less than 6.4 mm in length and spaced not more than 100 mm on centers, along the edges of the enclosure.

Padlocks will be State-furnished in accordance with "State-furnished Materials" of these special provisions.

Enclosures shall be galvanized, after fabrication, in conformance with the provisions in Section 75-1.05, "Galvanizing," of the Standard Specifications.

Concrete for the concrete pad shall conform to Section 90-10, "Minor Concrete," of the Standard Specifications.

Hold down bolt assemblies shall be galvanized and shall be installed when the portland cement concrete pad is still plastic. Nuts shall be hexagonal and washers shall be the lock type.

Enclosures shall be painted with one application of a commercial quality pre-treatment, vinyl wash primer and a minimum of one application of a commercial quality, exterior enamel for metal. The finish color shall be light brown.

All parts of the backflow preventer assembly enclosure, including hold down assemblies, may be constructed of stainless steel instead of standard steel materials specified above. Stainless steel enclosures shall conform to the provisions herein except galvanizing, priming and painting shall not be required. Stainless steel enclosures shall be powder coated a light brown color by the manufacturer.

The minimum clearance between the backflow preventer assembly and the backflow preventer assembly enclosure shall be 50 mm.

The quantity of backflow preventer assembly enclosures will be measured by the unit as determined from actual count in place.

The contract unit price paid for the backflow preventer assembly enclosure shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in furnishing and installing a backflow preventer assembly enclosure, complete in place, including constructing the portland cement concrete pad, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

TESTING NEW BACKFLOW PREVENTERS

New backflow preventers shall be tested for proper operation in conformance with the provisions in Section 20-5.03J, "Check and Test Backflow Preventers," of the Standard Specifications and these special provisions.

Tests for new backflow preventers shall be satisfactorily completed after installation .

New backflow preventers shall be retested one year after the satisfactory completion of the previous test, and each year thereafter until the plant establishment period is completed. An additional test shall be provided not more than 10 days prior to acceptance of the contract.

SECTION 10-2. (BLANK)

SECTION 10-3. SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS

10-3.01 DESCRIPTION

Modify signal and lighting, signal and lighting, lighting and sign illumination, ramp metering systems, closed circuit television system, fiber optic cable (various sizes), splice vault, model 170 controller interface, TOS cabinet, modify transportation management center, modify communication hub C, communication conduit (multiduct), temporary fiber optic, closed circuit television (CCTV), changeable message sign (CMS), maintaining existing traffic management system elements during construction shall conform to the provisions in Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications and these special provisions.

Lighting equipment is included in the following structures:

- A. Redlands Loop Overhead (Br. No. 54-489)
- B. Redlands Loop Overhead N215 to 2nd Street Off-ramp (Br. No. 54-1254S)
- C. Rialto Ave UC (Br. No. 54-488)
- D. Rialto Ave UC N215 to 2nd Street Off-ramp (Br. No. 54-1255S)
- E. Rialto Ave UC S215 to 2nd Street On-ramp (Br. No. 54-1256K)
- F. 2nd Street UC (Br. No. 54-1259)
- G. 3rd Street UC (Br. No. 54-1260)
- H. N215 to 5th Street Off-ramp (Br. No. 54-1251S)
- I. 5th Street to S215 On-ramp (Br. No. 54-1252K)
- J. ROUTE 66/I-215 SEP AND OH (Br. No. 54-1250)
- K. 9th Street OC (Br. No. 54-1222)
- L. Baseline Street OC (Br. No. 54-1223)
- M. SB Baseline Street Off-ramp (Br. No. 54-1225)
- N. SB Baseline Street On-ramp (Br. No. 54-1224)
- O. 16th Street OC/OH (Br. No. 54-1241)
- P. S259/S215 Conn. (Br. No. 54-1239F)
- Q. N215/N259 Conn. (Br. No. 54-1240G)

Communication conduit is included in the following structures:

- A. Redlands Loop Overhead (Br. No. 54-489)
- B. Rialto Ave UC (Br. No. 54-488)
- B. Rialto Ave UC N215 to 2nd Street Off-ramp (Br. No. 54-1255S)
- C. 2nd Street UC (Br. No. 54-1259)
- D. 3rd Street UC (Br. No. 54-1260)
- E. 9th Street OC (Br. No. 54-1222)
- F. Baseline Street OC (Br. No. 54-1223)
- G. 16th Street OC/OH (Br. No. 54-1241)

Traffic signal work shall be performed at the following locations:

- A. 2nd Street at I Street (Location 1)
- B. Southbound I-215 at 2nd Street (Location 2)
- C. Northbound I-215 at 2nd Street (Location 3)

- D. 3rd Street at I Street (Location 4)
- E. Southbound I-215 at 3rd Street (Location 5)
- F. Northbound I-215 at 3rd Street (Location 6)
- G. 3rd Street at G Street (Location 7)
- H. Southbound and Northbound I-215 at 4th Street (Location 8)
- I. 3rd /4th Street at G Street (Location 9)
- J. Southbound I-215 at 5th Street (Route 66) (Location 10)
- K. Northbound I-215 at 5th Street (Route 66) (Location 11)
- L. 6th Street at H Street (Location 12)
- M. 6th Street at G Street (Location 13)
- N. 9th Street at H Street (Location 14)
- O. Baseline Street at Southbound I-215 (Location 15)
- P. Baseline Street at Northbound I-215t (Location 16)
- Q. Baseline Street at H Street (Location 17)

Ramp metering work shall be performed at the following locations:

- A. 2nd Street to Southbound I-215 (Location 1)
- B. 3rd Street to Northbound I-215 (Location 2)
- C. 5th Street (Route 66) to Southbound I-215 (Location 3)
- D. 5th Street (Route 66) to Northbound I-215 (Location 4)
- E. Baseline Street to Southbound I-215 (Location 5)
- F. Baseline Street to Northbound I-215 (Location 6)
- G. Baseline Street to Northbound SR-259 (Location 7)

Closed circuit television system work is to be performed at the following locations:

Segment 1

- A. Location 1 at Station 113+00
- B. Location 2 at Station 120+16
- C. Location 3 at Station 32+10
- D. Location 4 at Station “Q” 8+78
- E. Location 5 at Station 140+23

Traffic operation system (TOS) cabinet work is to be performed at the following location:

- A. Station 120+85

Changeable message sign (CMS) work is to be performed at the following location:

- A. Station 121+24

Modify communication hub work is to be performed at the following location:

- A. Communication Hub C: at I-215 northbound to I-10 eastbound connector in I-10/I-215 interchange.

Modify transportation management center (TMC) equipment work shall be performed at the following location:

Transportation Management Center (TMC): at District Office 464 W. Fourth Street, Room # B-39, San Bernardino.

10-3.02 COST BREAK-DOWN

Cost break-downs shall conform to the provisions in Section 86-1.03, "Cost Break-Down," of the Standard Specifications and these special provisions.

The Engineer shall be furnished a cost break-down for each contract lump sum item of work described in this Section 10-3.

The cost break-down shall be submitted to the Engineer for approval within 15 days after the contract has been approved. The cost break-down shall be approved, in writing, by the Engineer before any partial payment for the items of electrical work will be made.

The cost breakdown shall include the following items in addition to those listed in the Standard Specifications:

- A. Innerducts
- B. Fiber optic cables – each size and type
- C. Type 334-CCTV Cabinet
- D. CCTV camera assemblies
- E. Pan/ tilt unit
- F. CCTV poles
- G. Asynchronous Fiber Optic Modems (AFOM)
- H. Camera Transceiver (TCVR)
- I. Camera control receiver (CCR)
- J. Video Multiplexer and Demultiplexer
- K. Interconnect Termination Unit (ITU)
- L. Fiber Optic Pigtails and Jumpers
- M. RS232 Serial Cables
- N. System Testing and Documentation

10-3.03 MAINTAINING EXISTING AND TEMPORARY ELECTRICAL SYSTEMS

Traffic signal system shutdowns shall be limited to periods between the hours of 9 a.m. and 4 p.m.

Traffic signal system shutdowns shall be limited to periods allowed for lane closures listed or specified in "Maintaining Traffic" of these special provisions.

10-3.04 MAINTAINING EXISTING TRAFFIC MANAGEMENT SYSTEM ELEMENTS DURING CONSTRUCTION

Traffic Management System (TMS) elements include, but are not limited to ramp metering (RM) system, communication system, traffic monitoring stations, video image vehicle detection system (VIVDS), microwave vehicle detection system (MVDS), loop detection system, changeable message sign (CMS) system, extinguishable message sign (EMS) system, highway advisory radio (HAR) system, closed circuit television (CCTV) camera system, roadway weather information system (RWIS), visibility sensor, and fiber optic system.

Existing TMS elements, including detection systems, identified on the plans and located within the project limits shall remain in place, and be protected from damage. If the construction activities require existing TMS elements to be nonoperational or off line, and if temporary or portable TMS elements are not shown on the plans, the Contractor shall provide for temporary or portable TMS elements. The Contractor shall receive the Engineer's approval on the type of temporary or portable TMS elements and installation method.

Before work is performed, the Engineer, the Contractor, and the Department's Traffic Operations Electrical representatives shall jointly conduct a pre-construction operational status check of all existing TMS elements and each element's communication status with the Traffic Management Center (TMC), including existing TMS elements that are not shown on the plans and elements that may not be impacted by the Contractor's activities. The Department's Traffic Operations Electrical representatives will certify the TMS elements' location and status, and provide a copy of the certified list of the existing TMS elements within the project limits to the Contractor. The status list will include the operational, defined as having full functionality, and the nonoperational components.

The Contractor shall obtain written approval from the Engineer, at least 72 hours before interrupting existing TMS elements' communication with the TMC that will result in the elements being nonoperational or off line. The Contractor shall notify the Engineer at least 72 hours before starting excavation activities.

Traffic monitoring stations and their associated communication systems which were verified to be operational during the pre-construction operational status check, shall remain operational on freeway/highway mainline at all times, except:

1. for a duration of up to 15 days on any continuous segment of the freeway/highway longer than 4.8 kilometers
2. for a duration of up to 60 days on any continuous segment of the freeway/highway shorter than 4.8 kilometers

If the construction activities require existing detection systems to be nonoperational or off line for a longer time period or the spacing between traffic monitoring stations is more than the specified criteria above, and temporary or portable detection operations are not shown on the plans, the Contractor shall provide provisions for temporary or portable detection operations. The Contractor shall receive the Engineer's approval on the type of detection and installation before installing the temporary or portable detection.

If existing TMS elements shown on the plans or identified during the pre-construction operational status check, except traffic monitoring stations, are damaged or fail due to the Contractor's activity, where the elements are not fully functional, the Engineer shall be notified immediately. If the Contractor is notified by the Engineer that existing TMS elements have been damaged, have failed or are not fully functional due to the Contractor's activity, the damaged or failed TMS elements, excluding Structure-related elements, shall be repaired or replaced, at the Contractor's expense, within 24 hours. For a Structure-related elements, the Contractor shall install temporary or portable TMS elements within 24 hours. For nonstructure-related TMS elements, the Engineer may approve temporary or portable TMS elements for use during the construction activities.

If fiber optic cables are damaged due to the Contractor's activities, the Contractor shall install new fiber optic cables from an original splice point or termination to an original splice point or termination, unless otherwise authorized in writing by the Engineer. Fiber optic cable shall be spliced at the splice vaults if available. The amount of new fiber optic cable slack in splice vaults and the number of new fiber optic cable splices shall be equivalent to the amount of slack

and number of splices existing before the damage or as directed by the Engineer. Fusion splicing will be required.

The Contractor shall demonstrate that repaired or replaced elements operate in a manner equal to or better than the replaced equipment or as directed by the Engineer. If the Contractor fails to perform required repairs or replacement work, as determined by the Engineer, the State may perform the repair or replacement work and the cost will be deducted from monies due to the Contractor.

A TMS element shall be considered nonoperational or off line for the duration of time that active communications with the TMC is disrupted, resulting in messages and commands not transmitted from or to the TMS element.

The Contractor shall provide provisions for replacing existing TMS elements within the project limits, including detection systems, that were not identified on the plans or during the pre-construction operational status check that became damaged due to Contractor's activities.

If the pre-construction operational status check identified existing TMS elements, then the Contractor, the Engineer, and the Department's Traffic Operations Electrical representatives shall jointly conduct a post construction operational status check of all existing TMS elements and each element's communication status with the TMC. The Department's Traffic Operations Electrical representatives will certify the TMS elements' status and provide a copy of the certified list of the existing TMS elements within the project limits to the Contractor. The status list will include the operational, defined as having full functionality, and the nonoperational components. TMS elements that cease to be functional between pre and post construction status checks shall be repaired at the Contractor's expense and as directed by the Engineer.

The Engineer will approve, in writing, the schedule for final replacement, the replacement methods and the replacement elements, including element types and installation methods before repair or replacement work is performed. The final TMS elements shall be new and of equal or better quality than the existing TMS elements.

PAYMENT

The contract lump sum price paid for maintaining existing traffic management system elements during construction shall include full compensation for furnishing all labor, materials, tools, equipment and incidentals, and for doing all the work involved in maintaining existing traffic management system elements as shown on the plans, specified in the Standard specifications and these special provisions, and as directed by the Engineer.

If no electrical work exists on the project and no TMS elements are identified within the project limits, the pre-construction operational status check will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Furnishing and installing temporary or portable TMS elements that are not shown on the plans, but are required when an existing TMS element becomes nonoperational or off line due to construction activities, will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

Furnishing and installing temporary or portable TMS elements and replacing TMS elements that are not shown on the plans nor identified during the pre-construction operational status check and were damaged by construction activities will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

If the Contractor is required to submit provisions for the replacement of TMS elements that were not identified, the provisions will be paid for as extra work as provided in Section 4-1.03D, "Extra Work," of the Standard Specifications.

10-3.05 CAMERA POLE

Camera pole shall be Type CCTV 35 unless otherwise specified. Sheet steel shall have a minimum yield of 331 Mpa. Modifications for hand hole, connector bracket and strain relief shall be made as shown on the plans.

Full compensation for camera pole shall be considered as included in the contract lump sum price paid for closed circuit television system at various locations and no separate payment will be made therefor.

10-3.06 FOUNDATIONS

Reinforced cast-in-drilled-hole concrete pile foundations for CCTV, traffic signal and lighting standards shall conform to the provisions in "Piling" of these special provisions.

Where cast-in-drilled-hole concrete pile foundations are to be constructed in slag aggregate embankments, the diameter of the pile shall be increased to provide a minimum of 75 mm of concrete cover over the reinforcing steel.

10-3.07 STANDARDS, STEEL PEDESTALS, AND POSTS

Standards, steel pedestals, and posts for traffic signal and lighting standards shall conform to the provisions in Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications, "Steel Structures" of these special provisions, and the following requirements.

Steel bolts not designated on the plans as high-strength (HS) or stainless steel shall be for general applications and shall conform to the requirements in ASTM Designation: A 307.

Where the plans refer to the side tenon detail at the end of the signal mast arm, the applicable tip tenon detail may be substituted.

The sign mounting hardware shall be installed at the locations shown on the plans.

The sign panels will be Contractor-furnished.

Mast arm mounted street name signs shall be installed on signal mast arms at the locations shown on the plans. The street name signs and mounting hardware (except straps, seals, and saddle brackets) will be Contractor-furnished. The Contractor -furnished hanger assembly will be similar to that shown for internally illuminated street name signs. The mounting hardware and sign shall be assembled. The assembly shall be attached to the mast arm using a 19 mm x 0.53 mm stainless steel strap in a manner similar to the strap and saddle bracket method shown on the plans. The band shall be wrapped at least twice around the mast arm, tightened, and secured with a stainless strap seal in the same manner shown for strap and saddle bracket sign mounting. Straps, seals, and saddle brackets shall be furnished by the Contractor. The sign panel shall be leveled and hardware securely tightened.

Handhole reinforcement rings for standards, steel pedestals, and posts shall be continuous around the handholes.

Type 1 standards shall be assembled and set with the handhole on the downstream side of the pole in relation to traffic or as shown on the plans.

All ferrous metal parts of tubular sign structures shall be galvanized and shall not be painted.

10-3.08 SLIP BASE INSERTS

Slip base inserts, for installation between the lighting standards and the foundations, shall conform to the details shown on the plans.

The bottom slip base plate shall be welded to the bottom anchor plate before installation. The top slip base plate shall be drilled and tapped to accept the threaded studs as shown on the plans. The studs shall not be welded to the top slip base plate. The pitch diameter of the threaded holes shall conform to the requirements in ANSI Standard: B1.1, having a Class 2B tolerance. Threaded studs installed in the top slip base plate shall match the holes in the base of the lighting standard.

The optional cast steel plate shall conform to the provisions in Section 86-2.04, "Standards, Steel Pedestals and Posts," of the Standard Specifications.

The combined bottom anchor plate and bottom slip base plate shall be bolted to the foundation. The top slip base plate, without the lighting standard attached, shall be bolted to the bottom slip base plate. Each high-strength bolt shall be torqued to $200 \pm 10 \text{ N}\cdot\text{m}$. After assembly of the insert, the lighting standard shall be erected and installed on the top slip base plate. During installation the lighting standard shall be properly supported to maintain proper alignment of the insert.

High strength bolts, nuts and flat washers used to connect slip base inserts shall conform to the requirements in ASTM Designation: A 325.

10-3.09 CONDUIT

Conduit to be installed underground shall be Type 3 schedule 80 unless otherwise specified. Detector termination conduits shall be Type 3 .

The conduit in a foundation and between a foundation and the nearest pull box shall be Type 3 schedule 80.

Conduit sizes shown on the plans and specified in the Standard Specifications and these special provisions are referenced to metallic type conduit. When rigid non-metallic conduit is required or allowed, the nominal equivalent industry size shall be used as shown in the following table:

Size Designation for Metallic Type Conduit	Equivalent Size for Rigid Non-metallic Conduit
21	20
27	25
41	40
53	50
63	65
78	75
103	100

After conductors have been installed, the ends of conduits terminating in pull boxes, service equipment enclosures, and controller cabinets shall be sealed with an approved type of sealing compound.

At locations where conduit is required to be installed under pavement and if a delay to vehicles will not exceed 5 minutes, conduit may be installed by the "Trenching in Pavement Method."

FIBER OPTIC CONDUIT

Fiber optic conduit is defined as conduit that will contain innerduct or fiber optic cable, as shown on the plans. Furnishing and installing fiber optic conduit shall conform to the provisions for conduits, and the following special provisions.

Conduit trenches in or adjacent to paved shoulders shall be backfilled within 3 calendar days. Conduit trenches in and across traffic lanes shall be backfilled during the same work period the trench is excavated except that the top 300 mm of asphalt shall be placed within 3 calendar days.

Minimum conduit bend radius shall be 10 times trade diameter.

At locations where conduit is required to be installed under pavement and existing underground facilities require special precautions, as described in "Obstructions" of these special provisions, conduit shall be placed by the "Trenching in Pavement Method" as specified in Section 86-2.05C.

No trenching shall be allowed across freeways and ramps.

Immediately prior to installing cables or innerduct, conduit shall be blown out with compressed air until all foreign material is removed.

After conductors and cables or innerduct have been installed, the ends of conduits and innerduct shall be sealed with an approved type of conduit sealing plug.

CONDUIT AND INNERDUCT SEALING PLUGS

Except as otherwise noted, all conduits containing fiber optic cables and innerducts shall have their ends sealed with commercial preformed plugs which prevent the passage of gas, dust and water into these conduits and their included innerducts. Sealing plugs shall be installed within each splice vault, pull box, cabinet, or building.

Sealing plugs shall be removable and reusable. Plugs sealing innerducts, conductor or cable shall be the split type that permits installation or removal without removing conductors or cables.

Sealing plugs that seal between the Size 103 fiber optic conduit and innerducts shall seal the conduit and all innerducts simultaneously with one self contained assembly having an adjustable resilient filler of polyurethane elastomer clamped between backing ends and compressed with stainless steel hardware.

Sealing plugs that seal the innerducts shall seal each innerduct individually with appropriate sizes and configuration to accommodate either empty ducts or those containing fiber optic cable. To provide suitable sealing between the varying size cables and the plugs, split polyurethane elastomer adapting sleeves, used singularly or in multiples, shall be inserted within the body of the plugs.

Sealing plugs used to seal Size 103 fiber optic conduit and innerducts shall be capable of withstanding a pressure of 34.5 kPa.

A sealing plug that seals an empty conduit or innerduct shall have an eye or other type of capturing device (on the side of the plug that enters the conduit) to attach onto the pull tape, so the pull tape will be easily accessible when the plug is removed.

Full compensation for furnishing and installing conduit and innerduct sealing plugs shall be considered as included in the contract prices paid per meter for conduit and innerduct they are sealing and no separate payment will be made therefor.

TRACER WIRE

Tracer wire shall be provided and placed in conduits containing fiber optic cable as shown on plans.

Tracer wire shall be a No. 12, minimum, solid copper conductor with Type TW, THW, RHW, or USE insulation. The tracer wire shall form a mechanically and electrically continuous line throughout the length of the trench. A minimum of 1 m of slack shall be extended into each splice vault from each direction.

Where trenched conduit joins conduit that has been jacked or drilled, the tracer wire shall be bonded to the metal conduit that has been installed by jacking or drilling with a brass grounding clamp.

Tracer wires may be spliced at intervals of not less than 150 m. Splices shall conform to Section 86-2.09, "Wiring," of the Standard Specifications.

Full compensation for furnishing and installing tracer wire shall be considered as included in the price or prices paid for conduit involved and no separate payment will be made therefor.

WARNING TAPE

Warning tape shall be provided and placed in the trench over conduits containing fiber optic cable as shown on the plans. The warning tape shall be 100 mm wide with bold printed black letters of approximately 19 mm on bright orange color background, and contain the printed warning "CAUTION BURIED FIBER OPTIC CABLE - CALTRANS" repeated at approximately 760 mm intervals.

The printed warning shall be non-erasable and shall be rated to last with the tape for a minimum of 40 years.

The construction of the warning tape shall be such that it will not delaminate when it is wet. It shall be resistant to insects, acid, alkaline and other corrosive elements in the soil. It shall have a minimum of 712 N. tensile strength per 150 mm wide strip and shall have a minimum of 700 percent elongation before breakage.

Warning tape shall be Condux International, Inc.; Allen System, Inc.; or equal.

Full compensation for furnishing and installing warning tape shall be considered as included in the price or prices paid for the conduit involved and no separate payment will be made therefore.

INNERDUCT

Innerduct shall be installed wherever fiber optic cable is installed in conduit, except conduit housing Type D fiber optic cable. Wherever Size 103 conduit is required, four Size 25 innerducts shall be installed.

Innerduct consists of an extruded flexible annealed polyethylene tubing that is installed inside conduit, and which in turn the fiber optic cable is installed. Innerduct within a conduit run shall be continuous without splices or joints. Innerduct for this project shall be continuous longitudinally ribbed inside and outside.

Unless otherwise shown on the plans, innerduct for this project shall be nominal 25 mm inside diameter, with wall thickness of $2300\ \mu\text{m} \pm 80\ \mu\text{m}$, and shall meet the following requirements:

Polyethylene for innerduct shall have a density of $0.955 \pm 0.005\ \text{gm/cm}^3$ (ASTM Standard D-1505), and shall conform to the applicable portions of ASTM Designations: D 3485, D 3035,

D 2239, and D 2447, and the applicable portions of NEMA TC7 and TC2. Tensile yield strength shall be a minimum of 23 MPa, (ASTM D-638).

Different innerducts within the same conduits shall be different colors and the colors chosen shall be consistent with the required cables throughout the project. See the table below:

Color	House fiber optic cable
Black	Type E
Orange	Type B
Yellow	Type C
White	Future use

Pull tapes for future use shall be installed in the innerducts when no fiber optic cable is installed.

The innerduct shall be shipped on reels marked with the manufacturer, the contract number, and the size and length of the innerduct. The product on reels shall be covered with aluminized material to protect colors from UV deterioration during shipment and storage.

Immediately prior to installing innerducts, all conduits shall be blown out with compressed air until all foreign material is removed. After cables, conductors and/or innerduct have been installed, the ends of innerducts shall be sealed with an approved type of sealing plugs.

A manufacturer recommended lubricant shall be applied between the innerducts and the conduit during installation to reduce friction.

Installation procedures shall conform to the procedures specified by the innerduct manufacturer. If the innerduct is installed using mechanical assistance, a dynamometer shall be used to record installation tension and a tension limiting device shall be used to prevent exceeding the maximum pulling tension during installation. The tension shall be set to the manufacturer's maximum limit. The maximum pulling tension shall be recorded for each innerduct run. The innerduct shall not be stressed beyond the maximum bending radius allowed by either the innerduct or fiber optic cable manufacturer.

Immediately prior to installing cables, innerduct shall be blown out with compressed air until all foreign material is removed. After cables have been installed, the ends of innerducts shall be sealed with an approved type of rubber conduit plug.

Each innerduct shall be one continuous unit within a conduit run.

Full compensation for furnishing and installing innerduct shall be considered as included in the price or prices paid for the fiber optic conduit involved and no separate payment will be made therefore.

10-3.10 CONDUCTORS AND WIRING

Splices shall be insulated by "Method B".

Signal Interconnect Cable (SIC) shall be the 6-pair type.

10-3.11 BONDING AND GROUNDING

Bonding and grounding shall conform to the provisions in Section 86-2.10, "Bonding and Grounding," of the Standard Specifications and these special provisions.

Bonding jumpers in standards with handholes and traffic pull box lid covers shall be attached by a UL listed lug using 4.5-mm diameter or larger brass or bronze bolts and shall run to the

conduit or bonding wire in the adjacent pull box. The grounding jumper shall be visible after the standard has been installed and the mortar pad and cap have been placed on the foundation.

Standards without handholes shall have bonding accomplished by jumpers attached to UL listed ground clamps on each anchor bolt.

For slip base standards or slip base inserts, bonding shall be accomplished by jumpers attached to UL listed ground clamps on each anchor bolt, or a UL listed lug attached to the bottom slip base plate with a 4.5-mm diameter or larger brass or bronze bolt.

Equipment bonding and grounding conductors are required in conduits, except when the conduits contain only fiber optic cable. A No. 8 minimum, bare copper wire shall run continuously in circuits. The bonding wire size shall be increased to match the circuit breaker size in conformance with the Code, or shall be as shown on the plans. Conduits to be installed for future conductors, may omit the copper wire.

Bonding of metallic conduits in metal pull boxes shall be by means of bonding bushings and bonding jumpers connected to the bonding wire running in the conduit system.

10-3.12 SERVICE

Continuous welding of exterior seams in service equipment enclosures is not required.

Circuit breakers shall not be the cable-in/cable-out type. All circuit breakers shall be mounted vertically with the up position of the handle being the "ON" position.

Circuits with Model 500 changeable message signs shall have service equipment enclosures which have main busses and terminal lugs rated for 100 A, minimum, and a No. 2 bare copper ground wire.

Each service shall be provided with up to 2 main circuit breakers which shall disconnect ungrounded service entrance conductors. Where the "Main" circuit breaker consists of 2 circuit breakers as shown on the plans or required in the special provisions, each of the circuit breakers shall have a minimum interrupting capacity of 10 000 A, rms.

The contractor shall pay all services connection fees and the monthly electrical bill for all temporary or stage electrical.

10-3.13 NUMBERING ELECTRICAL EQUIPMENT

The placement of numbers on electrical equipment will be done by others.

10-3.14 STATE-FURNISHED CONTROLLER ASSEMBLIES

The Model 170E and 2070L controller assemblies, excluding anchor bolts, will be State-furnished as provided under "Materials" of these special provisions.

The Contractor shall construct each controller cabinet foundation as shown on the plans for Model 332A and 334 cabinets (including furnishing and installing anchor bolts), shall install the controller cabinet on the foundation, and shall make field wiring connections to the terminal blocks in the controller cabinet.

A listing of field conductor terminations, in each State-furnished controller cabinet, will be furnished free of charge to the Contractor at the site of the work.

State forces will maintain controller assemblies. The Contractor's responsibility for controller assemblies shall be limited to conforming to the provisions in Section 6-1.02, "State-Furnished Materials," of the Standard Specifications.

10-3.15 VEHICLE SIGNAL FACES AND SIGNAL HEADS

Type SV-1-T mountings with 5 sections and SV-2-TD mountings shall be bolted to the standard through the upper pipe fitting in the same manner shown for bolting the terminal compartment.

10-3.16 LIGHT EMITTING DIODE SIGNAL MODULE

GENERAL

Summary

This work includes installing LED signal module. Comply with Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications.

Location of LED signal module is shown on the plans. The Engineer will approve exact location.

Use LED signal module as the light source for the following traffic signal faces:

1. 300-mm section
2. 200-mm section
3. 300-mm arrow section
4. 300-mm programmed visibility (PV) section

Submittals

Before shipping LED signal modules to job site, submit the following to the Transportation Laboratory:

1. Delivery form including district number, EA, and contact information
2. List containing all LED signal module serial numbers anticipated for use
3. LED signal modules

Quality Control and Assurance

Module must be one listed on the Pre-Qualified Products List for LED traffic signals at:

http://www.dot.ca.gov/hq/esc/approved_products_list

The State will test LED signal module shipments as specified in ANSI/ASQ Z1.4.. Testing will be completed within 30 days of delivery to the Transportation Laboratory. LED signal modules tested or submitted for testing must be representative of typical production units. LED and circular LED signal modules will be tested as specified in California Test 604. Arrow, U-turn, and bicycle LED signal modules will be tested as specified in California Test 3001. All parameters of the specification may be tested on the modules. LEDs must be spread evenly across the module. LED arrow indication must provide the minimum initial luminous intensity listed. Measurements will be performed at the rated operating voltage of 120 V(ac).

Delays resulting from submittal of non-compliant materials do not relieve you from executing the contract within the allotted time. Non-compliant materials will be rejected. You must resubmit new LED for retesting and pick up the failed units within 7 days of notification. You must provide new LED signal modules and allow a minimum of 30 days for the retest. You

must pay for all shipping and handling costs related to testing and retesting. Delays resulting from resubmittal and retesting are your responsibility and no extra time will be allowed.

After testing, you must pick up the tested LED signal modules from the Transportation Laboratory and deliver to the job site.

Warranty

The manufacturer must provide a written warranty against defects in materials and workmanship for LED signal modules for a minimum period of 48 months after installation of LED signal modules. Replacement LED signal modules must be provided within 15 days after receipt of failed LED modules at your expense. The State pays for shipping the failed modules to you. All warranty documentation must be submitted to the Engineer before installation. Replacement LED signal modules must be delivered to State Maintenance Electrical Shop at 175 Cluster Street San Bernardino CA. 92145_.

MATERIALS

Minimum power consumption for LED signal module must be 5 W.

LED signal module must have an operational lifecycle rating of 48 months. During the operational lifecycle, LED signal module must meet all parameters of this specification.

LED signal module must be designed for installation in the door frame of standard traffic signal housing.

LED signal module must:

1. Be 1.8 kg maximum mass
2. Be manufactured for 300-mm circular, 200-mm circular, arrow, U-turn, bicycle, and lane control section
3. Be from the same manufacturer
4. Be the same model for each size
5. Be sealed units with:
 - 5.1. 2 color-coded conductors for power connection, except for lane control LED signal modules use 3 color-coded conductors.
 - 5.2. Printed circuit board and power supply contained inside and complying with Chapter 1, Section 6 of TEES published by the Department.
 - 5.3. Lens that is:
 - 5.3.1. Integral to the units
 - 5.3.2. Convex or flat with a smooth outer surface
 - 5.3.3. Made of UV stabilized plastic or glass, and withstands UV exposure from direct sunlight for 48 months without exhibiting evidence of deterioration
 - 5.4. 1-piece EPDM gasket
6. Include 1-meter long conductors with quick disconnect terminals attached as specified in Section 86-4.01C, "Electrical Components," of the Standard Specifications
7. Be sealed in door frames
8. Fit into existing traffic signal section housing and comply with ITE publication, Equipment and Material Standards, Chapter 2, "Vehicle Traffic Control Signal Heads"

Individual LEDs must be wired so catastrophic loss or failure of 1 LED will not result in loss of more than 5 percent of the signal module light output. Failure of an individual LED in a string must not result in loss of entire string or other indication.

No special tools for installation are allowed.

300-mm Arrow

Comply with Section 9.01 of ITE publication, Equipment and Material Standards, Chapter 2, "Vehicle Traffic Control Signal Heads" for arrow indications.

LED signal module must:

1. Be weather tight and connect directly to electrical wiring.
2. Be capable of optical unit replacement.
3. Be a single, self-contained device, ready for installation into traffic signal housing.
4. Have manufacturer's name, trademark, model number, serial number, lot number, month and year of manufacture, and required operating characteristics, including rated voltage, power consumption, and volt-ampere, permanently marked on the back of the module.
5. Have a symbol of module type and color. Symbol must be 25 mm in diameter. Color must be written out in 13 mm high letters next to the symbol.
6. Be AlInGaP technology for red and yellow indications and gallium nitride technology for green indications.
7. Be ultra bright type rated for 100,000 hours of continuous operation from -40 °C to +74 °C.
8. Have a maximum power consumption as follows:

LED Signal Module Type	Power Consumption Requirements					
	Power Consumption (Watts)					
	Red		Yellow		Green	
	25 °C	74 °C	25 °C	74 °C	25 °C	74 °C
300-mm circular	11	17	22	25	15	15
200-mm circular	8	13	13	16	12	12
300-mm arrow	9	12	10	12	11	11
300-mm U-turn	9	12	10	12	11	11
Bicycle	11	17	22	25	15	15
Programmed Visibility	11	17	22	25	15	15
Lane Control (X)	9	12	--	--	--	--
Lane Control (Arrow)	--	--	--	--	11	11

Lens may be tinted, or may use transparent film or materials with similar characteristics to enhance "ON/OFF" contrasts. Tinting or other materials to enhance "ON/OFF" contrast must not affect chromaticity and must be uniform across the face of the lens.

If polymeric lens is used, surface coating or chemical surface treatment must be applied for front surface abrasion resistance.

Power supply must be integral to the module.

Internal components must be adequately supported to withstand mechanical shock and vibration from high winds and other sources.

Lens and LED signal module material must comply with the ASTM specifications for that material.

Enclosures containing either the power supply or electronic components of LED signal module, except lenses, must be made of UL94VO flame-retardant material.

If a specific mounting orientation is required, the LED signal module must have prominent and permanent vertical markings for accurate indexing and orientation within the signal housing. Markings must include an up arrow, or the word "UP" or "TOP."

LED signal module must meet or exceed the following values when operating at 25 °C:

Minimum Initial Intensities for Circular Indications (cd)

Angle (v,h)	200-mm			300-mm		
	Red	Yellow	Green	Red	Yellow	Green
2.5, ±2.5	157	314	314	399	798	798
2.5, ±7.5	114	228	228	295	589	589
2.5, ±12.5	67	133	133	166	333	333
2.5, ±17.5	29	57	57	90	181	181
7.5, ±2.5	119	238	238	266	532	532
7.5, ±7.5	105	209	209	238	475	475
7.5, ±12.5	76	152	152	171	342	342
7.5, ±17.5	48	95	95	105	209	209
7.5, ±22.5	21	43	43	45	90	90
7.5, ±27.5	12	24	24	19	38	38
12.5, ±2.5	43	86	86	59	119	119
12.5, ±7.5	38	76	76	57	114	114
12.5, ±12.5	33	67	67	52	105	105
12.5, ±17.5	24	48	48	40	81	81
12.5, ±22.5	14	29	29	26	52	52
12.5, ±27.5	10	19	19	19	38	38
17.5, ±2.5	19	38	38	26	52	52
17.5, ±7.5	17	33	33	26	52	52
17.5, ±12.5	12	24	24	26	52	52
17.5, ±17.5	10	19	19	26	52	52
17.5, ±22.5	7	14	14	24	48	48
17.5, ±27.5	5	10	10	19	38	38

Minimum Luminance for Arrows, U-turn, Bicycle, Lane Control, and PV Indications (cd/m²)

	Red	Yellow	Green
Arrow Indication	5,500	11,000	11,000
PV Indication (cd at 2.5°±2.5°)	314	314	314

LED signal module must meet or exceed the following illumination values for 48 months when operating over a temperature range of -40 °C to + 74 °C. Yellow LED signal module must meet or exceed the following illumination values for 48 months, when operating at 25 °C:

Minimum Maintained Intensities for Circular Indications (cd)

Angle (v,h)	200-mm			300-mm		
	Red	Yellow	Green	Red	Yellow	Green
2.5, ±2.5	133	267	267	339	678	678
2.5, ±7.5	97	194	194	251	501	501
2.5, ±12.5	57	113	113	141	283	283
2.5, ±17.5	25	48	48	77	154	154
7.5, ±2.5	101	202	202	226	452	452
7.5, ±7.5	89	178	178	202	404	404
7.5, ±12.5	65	129	129	145	291	291
7.5, ±17.5	41	81	81	89	178	178
7.5, ±22.5	18	37	37	38	77	77
7.5, ±27.5	10	20	20	16	32	32
12.5, ±2.5	37	73	73	50	101	101
12.5, ±7.5	32	65	65	48	97	97
12.5, ±12.5	28	57	57	44	89	89
12.5, ±17.5	20	41	41	34	69	69
12.5, ±22.5	12	25	25	22	44	44
12.5, ±27.5	9	16	16	16	32	32
17.5, ±2.5	16	32	32	22	44	44
17.5, ±7.5	14	28	28	22	44	44
17.5, ±12.5	10	20	20	22	44	44
17.5, ±17.5	9	16	16	22	44	44
17.5, ±22.5	6	12	12	20	41	41
17.5, ±27.5	4	9	9	16	32	32

Minimum Maintained Luminance for Arrow, U-turn, Bicycle, Lane Control, and PV Indications (cd/m²)

	Red	Yellow	Green
Arrow Indication	5,500	11,000	11,000
PV Indication (at 2.5°±2.5°)	314	314	314

LED signal module must comply with the following chromaticity requirements for 48 months when operating over a temperature range of -40 °C to +74 °C.

Chromaticity Standards (CIE Chart)

Red	Y: not greater than 0.308, or less than 0.998 - x
Yellow	Y: not less than 0.411, nor less than 0.995 - x, nor greater than 0.452
Green	Y: not less than 0.506 - 0.519x, nor less than 0.150 + 1.068x, nor more than 0.730 - x

LED signal module must operate:

1. At a frequency of 60 Hz ± 3 Hz, over a voltage range from 95 V(ac) to 135 V(ac), without perceptible flicker to the unaided eye. Fluctuations of line voltage must have no visible effect on luminous intensity of the indications. Rated voltage for measurements must be 120 V(ac).
2. Compatible with currently used controller assemblies, including solid state load switches, flashers, and conflict monitors. Comply with TEES Chapters 3 and 6. If a 20 mA alternating current or less is applied to the unit, the voltage read across the 2 leads must be 15 V(ac) or less.

Wiring and terminal block must comply with Section 13.02 of ITE publication, Equipment and Material Standards, Chapter 2, "Vehicle Traffic Control Signal Heads." Electrical connection for each Type 1 LED signal module must be 2 secured, color-coded, 1-meter long, 600 V(ac), 20 AWG minimum stranded jacketed copper wires. Wires must comply with NEC, rated for service at +105 °C.

LED signal module on-board circuitry must:

1. Include voltage surge protection to withstand high-repetition noise transients. The voltage surge protection must comply with NEMA Standard TS2, Section 2.1.6.
2. Comply with FCC, Title 47, SubPart B, Section 15 regulations for Class A emission limits for electronic noise.

LED signal module must provide a power factor of 0.90 or greater.

Total harmonic distortion from current and voltage induced into an alternating current power line by LED signal module must not exceed 20 percent at an operating temperature of 25 °C.

When power is applied to LED signal module, light emission must occur within 90 ms.

Red and Yellow Flashing LED Signal Module

10-3.17 BATTERY BACKUP SYSTEM

GENERAL

Summary

This work includes installing battery backup system (BBS). Comply with Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications and TEES.

The State will furnish BBS components as listed in "Materials" of these special provisions. You must furnish the external cabinet and batteries.

Submittals

Before shipping external cabinets to the jobsite, submit material list including contract number, cabinet serial numbers, and contact information to the Transportation Laboratory.

Submit a Certificate of Compliance for each external cabinet and batteries to the Engineer under Section 6-1.07, "Certificates of Compliance," of the Standard Specifications.

Quality Control and Assurance

The State may test the cabinets.

Functional Testing

After complete installation, BBS functional test must be performed. Test for 30 minutes of continuous, satisfactory operation with utility power turned off. Perform test in the presence of the Engineer.

Warranty

Batteries must be warranted by the manufacturer to operate within a temperature range of -25 °C to +74 °C for 2 years.

Batteries must have a written warranty against defects in materials and workmanship from the manufacturer prorated for a period of 60 months after installation. You must provide the Engineer with all warranty documentation before installation. Replacement batteries must be available within 5 business days after receipt of failed batteries at no cost to the State except the cost of shipping the failed batteries. Replacement batteries must be delivered to Caltrans Maintenance Electrical Shop at 175 Cluster Street San Bernardino CA. 92145.

MATERIALS

Batteries must:

1. Be deep cycle, sealed prismatic, lead-calcium-based, absorbed-glass mat and valve-regulated lead acid (AGM/VRLA) type
2. Have voltage rating of 12 V
3. Be group size 24
4. Be commercially available and stocked locally
5. Have a carrying handle
6. Be marked with date code, maximum recharge data, and recharge cycles
7. Have 2 top-mounted, threaded, stud posts that include all washers and nuts required for attaching 9.5-mm ring lugs of a State-furnished BBS battery harness
8. Include rubber insulating protective covers for protecting the lugs, posts, and wiring - red for positive terminal and black for negative terminal
9. Be new and fully-charged when furnished
10. Be free from damage or deformities

External cabinet must be one listed on the Pre-Qualified Products List at:

http://www.dot.ca.gov/hq/esc/approved_products_list/

External cabinet must be capable of housing:

1. 8 batteries
2. Inverter/charger unit
3. Power transfer relay
4. Manually-operated bypass switch
5. Required control panels
6. Wiring and harnesses

Dimensions and details for the external cabinet, for attaching the external cabinet to the Model 332A cabinet, and for wiring the State-furnished equipment will be available in an information handout as described in "Project Information" of these special provisions.

The following details must comply with Section 86-3.04, "Controller Cabinets," of the Standard Specifications and TEES:

1. Door construction, including material, thickness, coating, and welds
2. Frame
3. Door seals
4. Continuous stainless steel piano hinge or 4 leaves with 2 bolts on each side of each leaf, used to connect the door to external cabinet

5. Padlock clasp or latch and lock mechanism

The external cabinet must be ventilated by using louvered vents, filter, and a thermostatically controlled fan. Fan must be AC-operated from the same line output as the Model 332A cabinet. A 2-position terminal block must be provided on the fan panel, along with 3 meters of connected hookup wire.

The external cabinet surface must be anodized aluminum. Anti-graffiti paint must not be used.

The external cabinet must include all bolts, washers, nuts, and cabinet-to-cabinet coupler fittings necessary for mounting it to the Model 332A cabinet.

Fasteners for the external cabinet must include:

1. 8 cabinet mounting bolts that are 18-8 stainless steel hex head, fully-threaded, and 9.5 mm – 16 x 25.4 mm
2. 2 washers per bolt designed for 9.5-mm bolt and are 18-8 stainless steel 25.4-mm OD round flat type
3. K-lock nut per bolt: K-lock washer that is 18-8 stainless steel and hex-nut

External cabinet to Model 332A cabinet couplings must include a conduit for power connections between the 2 cabinets. Couplings must include:

1. 51-mm nylon-insulated steel chase nipple, T & B 1947 or equivalent
2. 51-mm sealing, steel locknut, T & B 146SL or equivalent
3. 51-mm nylon-insulated steel bushing, T & B 1227 or equivalent

CONSTRUCTION

Mount external cabinet to either the left or right side of Model 332A cabinet. The typical side-mounting location of external cabinet is flush with the bottom of the Model 332A cabinet and approximately equidistant from the front and rear door edges.

MEASUREMENT AND PAYMENT

Full compensation for assembling and installing battery backup system is included in the contract lump sum price paid for signal and lighting at various locations, and no separate payment will be made therefor.

10-3.18 LIGHT EMITTING DIODE PEDESTRIAN SIGNAL FACE MODULES

GENERAL

Summary

This work includes installing LED pedestrian signal face (PSF) module into standard Type A pedestrian signal housing. Comply with Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications.

Submittals

Before shipping LED PSF modules to job site, submit the following to the Transportation Laboratory:

1. Delivery form including district number, EA, and contact information
2. List containing all LED PSF module serial numbers anticipated for use
3. LED PSF modules

Quality Control and Assurance

Module must be one listed on the Pre-Qualified Products List for LED traffic signals at:

http://www.dot.ca.gov/hq/esc/approved_products_list

The State will test LED PSF module shipments as specified in ANSI/ASQ Z1.4.. Testing will be completed within 30 days of delivery to the Transportation Laboratory. LED PSF modules tested or submitted for testing must be representative of typical production units. LED PSF modules will be tested as specified in California Test 606. All parameters of the specification may be tested on the modules.

Delays resulting from submittal of non-compliant materials do not relieve you from executing the contract within the allotted time. Non-compliant materials will be rejected. You must resubmit new LED for retesting and pick up the failed units within 7 days of notification. You must provide new LED PSF modules and allow a minimum of 30 days for the retest. You must pay for all shipping and handling costs related to testing and retesting. Delays resulting from resubmittal and retesting are your responsibility and no extra time will be allowed.

After successful testing, you must pick up the tested LED PSF modules from the Transportation Laboratory and deliver to the job site.

Warranty

The manufacturer must provide a written warranty against defects in materials and workmanship for LED PSF modules for a minimum period of 48 months after installation of LED PSF modules. Replacement LED PSF modules must be provided within 15 days after receipt of failed LED PSF modules at your expense. The State pays for shipping the failed modules to you. All warranty documentation must be submitted to the Engineer before installation. Replacement LED PSF modules must be delivered to State Maintenance Electrical Shop at 175 Cluster Street San Bernardino CA. 92145.

MATERIALS

LED PSF module must:

1. Be from the same manufacturer.
2. Be installed in standard Type A pedestrian signal housing, "UPRAISED HAND" and "WALKING PERSON." Do not include reflectors.
3. Use LED as the light source.
4. Be designed to mount behind or replace face plates of standard Type A housing as specified in ITE publication, Equipment and Material Standards, Chapter 3, "Pedestrian Traffic Control Signal Indications" and the "California MUTCD."
5. Have a minimum power consumption of 10 W.
6. Use required color and be ultra bright type rated for 100,000 hours of continuous operation from -40 °C to +74 °C.
7. Be able to replace signal lamp optical units and pedestrian signal faces with both LED and incandescent light sources.

8. Fit into pedestrian signal section housings without modifications to the housing. The housing must comply with ITE publication, Equipment and Materials Standards, Chapter 3, "Pedestrian Traffic Control Signal Heads."
9. Be a single, self-contained device, not requiring on-site assembly for installation into standard Type A housing.
10. Have the following information permanently marked on the back of module:

- 10.1. Manufacturer's name
- 10.2. Trademark
- 10.3. Model number
- 10.4. Serial number
- 10.5. Lot number
- 10.6. Month and year of manufacture
- 10.7. Required operating characteristics, as follows:

- 10.7.1. Rated voltage
- 10.7.2. Power consumption
- 10.7.3. Volt-ampere (VA)
- 10.7.4. Power factor

11. Have prominent and permanent vertical markings for accurate indexing and orientation within the signal housing if a specific mounting orientation is required. Markings must include an up arrow, or the word "UP" or "TOP." Marking must be a minimum of 25-mm diameter.

Circuit board and power supply must be contained inside the LED PSF modules. Circuit board must comply with Chapter 1, Section 6 of TEES published by the Department.

Individual LEDs must be wired so catastrophic loss or failure of 1 LED will not result in loss of more than 5 percent of the PSF module light output. Failure of an individual LED in a string must not result in the loss of entire string or other indication.

LEDs must be evenly distributed in each indication. Do not use outline forms.

No special tools for installation are allowed.

Power supply for LED PSF module must be integral to the module. Power supply for each symbol must be isolated to avoid turn-on conflict.

Assembly and manufacturing processes for LED PSF module must assure that all internal components are adequately supported to withstand mechanical shock and vibration from high winds and other sources.

Material used for LED PSF module must comply with ASTM D 3935.

Enclosures containing either the power supply or electronic components of LED PSF module, except lenses, must be made of UL94VO flame-retardant material.

Color of "UPRAISED HAND" symbol must be portland orange.

Color of "WALKING PERSON" symbol must be lunar white.

Each symbol must not be less than 250 mm high and 165 mm wide. Uniformity ratio of illuminated symbols must not exceed 4 to 1 between highest and lowest luminance areas. Symbols must comply with ITE publication, Equipment and Material Standards, Chapter 3, "Pedestrian Traffic Control Signal Indications," and the "California MUTCD."

LED PSF module must maintain an average luminance value over 48 months of continuous use in signal operation for a temperature range of -40 °C to +74 °C. In addition, LED PSF modules must meet or exceed the following luminance values upon initial testing at 25 °C.

Luminance Values

PSF module	Luminance
UPRAISED HAND	3,750 cd/m2
WALKING PERSON	5,300 cd/m2

Color output of LED PSF module must comply with chromaticity requirements in Section 5.3 of ITE publication, Equipment and Material Standards, Chapter 3, "Pedestrian Traffic Control Signal Indications."

Measured chromaticity coordinates of LED PSF module must comply with the following chromaticity requirements for 48 months when operating over a temperature range of -40 °C to +74 °C.

Chromaticity Standards (CIE Chart)

UPRAISED HAND (portland orange)	Not greater than 0.390, nor less than 0.331, nor less than 0.997-X
WALKING PERSON (lunar white)	X: not less than 0.280, nor greater than 0.320 Y: not less than 1.055*X - 0.0128, nor greater than 1.055*X + 0.0072

LED PSF module maximum power consumption must not exceed the following values:

Power Consumption Requirements

PSF module	Power Consumption @ 24°C	Power Consumption @ 74°C
UPRAISED HAND	10.0 W	12.0 W
WALKING PERSON	9.0 W	12.0 W

Wiring and terminal block must comply with Section 13.02 of ITE publication, Equipment and Material Standards, Chapter 2, "Vehicle Traffic Control Signal Heads." The LED PSF module must be supplied with spade lugs and 3 secured, color-coded, 1 meter long, 600 V(ac), 20 AWG minimum stranded jacketed copper wires. Wires must comply with NEC, rated for service at +105 °C.

LED PSF module must operate:

1. At a frequency of 60 Hz \pm 3 Hz over a voltage range from 95 V(ac) to 135 V(ac) without perceptible flicker to the unaided eye. Fluctuations of line voltage must have no visible effect on luminous intensity of the indications. Rated voltage for measurements must be 120 V(ac).
2. Compatible with currently used State controller assemblies including solid state load switches, flashers, and conflict monitors. Comply with TEES Chapters 3 and 6. If a 20 ma alternating current or less is applied to the unit, the voltage read across the 2 leads must be 15 V(ac) or less.

LED PSF module on-board circuitry must:

1. Include voltage surge protection to withstand high-repetition noise transients. The voltage surge protection must comply with NEMA Standard TS2, Section 2.1.6.
2. Comply with FCC, Title 47, SubPart B, Section 15 regulations for Class A emission limits for electronic noise.

LED PSF module must provide a power factor of 0.90 or greater.

Total harmonic distortion from current and voltage induced into an alternating current power line by LED PSF module must not exceed 20 percent at an operating temperature of 25 °C.

The LED PSF module circuitry must prevent perceptible light emission to the unaided eye when a voltage, 50 V(ac) or less is applied to the unit.

When power is applied to LED PSF module, light emission must occur within 90 ms.

The "UPRAISED HAND" and "WALKING PERSON" symbol indications must be electrically isolated from each other. Sharing a power supply or interconnect circuitry between the 2 indications is not allowed.

10-3.19 DETECTORS

Loop detector sensor units will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

Loop wire shall be Type 2.

Loop detector lead-in cable shall be Type B .

Slots shall be filled with elastomeric sealant hot-melt rubberized asphalt sealant.

At the Contractor's option, where a Type A or a Type B loop is designated on the plans, a Type E loop may be substituted.

For Type E detector loops, sides of the slot shall be vertical and the minimum radius of the slot entering and leaving the circular part of the loop shall be 40 mm. Slot width shall be a maximum of 16 mm. Loop wire for circular loops shall be Type 2. Slots of circular loops shall be filled with elastomeric sealant or hot melt rubberized asphalt sealant.

Slots in portland cement concrete shall be filled with elastomeric sealant or hot-melt rubberized asphalt sealant, or shall be filled with an epoxy sealant conforming to the provisions in Section 95-2.09, "Epoxy Sealant for Inductive Loops," of the Standard Specifications.

PREFORMED INDUCTIVE LOOPS

Preformed inductive loops shall be the type shown on the plans.

The loop shall be 1.8 m square unless otherwise shown. The loop shall consist of 4 turns of No. 16, or larger, wire with Type THWN or TFFN insulation.

The loop wires shall be encased in Size 10, minimum, Schedule 40 or Schedule 80 PVC or polypropylene conduit. The conduit shall be sealed to prevent the entrance of water and the movement of wires within the conduit.

The loop wires from the preformed loop to the adjacent pull box shall be twisted together into a pair (at least 7 turns per meter) and encased in Schedule 40 or Schedule 80 PVC or polypropylene conduit between the preformed loop and the adjacent pull box or detector handhole. The lead-in conduit shall be sealed to prevent the entrance of water at the pull box or handhole end.

In new roadways, the preformed loops and lead-in conduits shall be placed in the base course, with the top of the conduit flush with the top of the base, and then covered with hot mix asphalt or portland cement concrete pavement. Preformed loops and lead-in conduits shall be protected from damage prior to and during pavement placement.

In new reinforced concrete structure decks, the preformed loops shall be secured to the top of the uppermost layer of reinforcing steel using nylon wire ties. The loop shall be held parallel to the structure deck by using PVC or polypropylene spacers where necessary. Conduit for lead-in conductors shall be placed between the uppermost 2 layers of reinforcing steel.

Preformed inductive loops shall not be installed in existing structure decks.

Slots in portland cement concrete pavement shall be filled with epoxy sealant or hot melt rubberized asphalt sealant.

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WMWald-HQ-Calnet (461-9048)

Rev. 0

This Video Image Vehicle Detection System(s) (VIVDS) SSP is for vehicle detection at the limit lines of signalized intersections.

10-3.20 VIDEO IMAGE VEHICLE DETECTION SYSTEM – SIGNAL OPERATION

This work furnishes a Video Image Vehicle Detection System (VIVDS) for operating traffic signals on all approaches shown on the plans and includes an initial site analysis, set-up and system configuration, calibration of the system, performance accuracy verification and training.

Materials List and Drawings

The Contractor shall submit a proposed list of materials before commencing work and drawings and other data before the completion of the contract:

- A. Certificate of Compliance** – Provide a Certificate of Compliance and report on the final installed configuration reviewed and approved by the manufacturer.
- B. Site Analysis Report** – Evaluate and provide a written analysis for each detection site recommending the optimum video sensor placement approved by the manufacturer.
- C. Lane Configuration** - Provide a diagram of each sensor assembly placement, mounting height, selected lens viewing angle and illustration of how the detection zone will map into reporting contact outputs as well as how output connector pins or wire terminals correspond to the lane assignments.
- D. Configuration Record** - Provide a Windows PC compatible Compact Disk (CD) that contains the final zone designs as well as calibration settings formatted to allow the same configuration to be re-installed and used in the event of disputed performance.
- E. Mounting and Wiring Information** – Provide one set of the approved diagrams detailing wiring and service connections, covered on each side with clear self-adhesive plastic and placed in a heavy-duty plastic envelope. Secure the envelope to the inside of the cabinet door or at a location designated by the Engineer.
- F. Communication Protocol** - Provide a document that completely defines the unit's communication protocol (message structure organization, data packet length as well as information necessary to make use of such messages) as well as all information needed for operating the system from a remote Windows based Personal Computer (PC).
- G. Programming Software** - Provide a PC compatible Compact Disk (CD) that contains set-up and calibration software which observes the vehicular traffic, allows placement of detection zones and adjustment of the detection sensitivity.
- H. Sensor Accuracy Analysis** - Submit to the Engineer a VIVDS accuracy analysis, including original video recordings as well as DVD or CD copies of the video images covering the analysis periods within fifteen days of accuracy testing.

- I. Acceptance Testing Schedule**—Submit an acceptance testing schedule to the Engineer for approval fifteen days prior to acceptance testing of the VIVDS. Acceptance testing shall be separate from the sensor accuracy testing noted in the previous paragraph.
- J. Acceptance Testing Documentation**- Provide documentation necessary to utilize the support equipment that is organized so that the Engineer will be able to perform acceptance testing using the documentation without assistance from the Contractor.
- K. Training** – Provide a copy of the training material to the Engineer for approval 30 days prior to the training.

Functional Requirements

The VIVDS shall consist of enclosed and environmentally protected Video Image Sensor assemblies (VIS) and mounting hardware assemblies installed on poles or mast-arms as shown on the plans. Includes Necessary Video Detection Units (VDU), image processors, extension modules as well as power supplies, surge suppression, cables, connectors and wiring to a State Furnished type 332 traffic control cabinet.

The VIS image sensor and lens shall be housed in an environmentally sealed enclosure, waterproof and dust tight to NEMA 4 standards. The enclosure shall include a thermostat controlled heater to prevent condensation and assure proper lens operation at low temperatures and an adjustable sun shield with provision to divert water from the sensor field of view. The assembly shall have water tight connections for power, control and video signal cables and wiring.

The VIVDS shall include necessary hardware and software for designing the necessary detection pattern or zones at the intersection or approach. The detection zones shall be created with a graphic user interface designed to allow trained State employee to configure and calibrate a lane in less than 15 minutes. The system shall support normal operation of existing detection zones while a zone is being added or modified. The zone to flash or change color on a viewing monitor whenever a vehicle is detected.

Include software and firmware that detects vehicle presence and count, the means to set-up detection zones, test the VIVDS performance as well as view the video scenes and operate the system from a remote location.

The system shall allow the user to define detection zones or elements and to set detection outputs for presence or pulse operation. The number of optically isolated detection outputs shall equal to the detection loops shown on the plans plus one spare output for every approach.

The VIVDS shall support a minimum of two separate detection pattern or zone arrangements that can be automatically enacted by timed schedule from the traffic controller or by a remote operator over a network connection. The system shall detect low-visibility conditions including severe fog and inclement weather and respond by selecting a predefined detection pattern and, when necessary, placing all defined detection zones into a constant call mode. VIVDS outputs shall assume a fail-safe “on” or “call” for presence detection in the event of loss of video signal or power failure and recover from a power failure by restoring normal operation within three minutes without manual intervention. The system shall maintain the configuration and calibration information in memory while powered off for at least 90 days.

The VIVDS shall detect the presence of vehicles at the limit line and loop positions shown on the plans and provide corresponding VIVDS contact outputs to the Model 170E or Model 2070 input files. The system shall detect vehicle presence at the limit line with 98% accuracy for each approach and over each one hour test period. The system shall not miss the detecting of more than 3% of the vehicles present and not indicate more than 5% false vehicle readings for any traffic movement. Detected vehicle presence shall be indicated in 0.25 seconds or less of

occurrence and the VIVDS shall hold presence for vehicles stopped in a detection zone for up to 10 minutes.

The VIVDS shall count vehicles with a better than 95 percent accuracy for each approach over each one hour test period and when compared to video recorded vehicle observations. The VIVDS shall be able to locally store for remote retrieval per lane vehicle count data in 10, 20, 30, and 60 minute intervals for a minimum period of one week (168 hours).

The VDU front panel shall have indications for power, communication, presence of video input for each video sensor as well as the real time detector output operation. A test switch shall have positions that allow the user to place either a constant or momentary call for each approach. The indications shall be visible in daylight from 1.5 m away.

A pull down flat panel video display with a minimum 8 inch screen shall be included in the 332 cabinet for viewing video detector images and for diagnostic testing. Each VID shall have Video connections that support the NTCS video output format and means shall be included that allow the user to switch to any VID signal at an intersection. System is to allow independent viewing of any scene while video recording any other scene without interfering with the operation of the system outputs.

The VIVDS shall have a serial communication port that supports sensor unit setup, diagnostics and operation from a local Windows PC compatible laptop or from a remote location with a desktop computer and standard phone modem. The system shall be addressable and shall download count data when poled remotely.

Technical Requirements

System elements shall be designed to operate continuously in an outdoor traffic monitoring and control environment, 24 hours a day. Manufacturing quality and electronic components shall support a minimum mean time between failure (MTBF) of ten (10) years.

The video image sensor assembly (VIS) shall include the video sensor, a zoom lens and weatherproof enclosure. The video sensor shall use a Charged Coupled Device (CCD) element and support NTSC and RS170 video output formats with resolution of not less than 360 horizontal lines. The video sensor shall include an Auto-Gain Control circuit (AGC), have a minimum sensitivity to scene luminance from 0.1 lux to 10,000 lux and produce a usable video image of vehicles, under all roadway lighting conditions and regardless of the time of day. The sensor shall have a motorized lens with variable focus and zoom control with an aperture of f/1.4 or better. The focal length shall allow +/- 50% adjustment of the detection scene.

The enclosed video image sensor assembly (VIS) shall operate from -34°C to +74°C and 0 percent to 95 percent relative humidity, weigh less than 3 kg and present less than 930 sq cm of effective wind surface to any direction.

Sensor unit mounting hardware shall be stainless steel or be treated to withstand 250 hours of salt fog exposure under ASTM-B117 conditions without any visible corrosive damage.

The VDU including image processors, extension modules and video output assemblies shall insert into the controller input file slots using the edge connector to obtain limited 24VDC power and to provide contact closure outputs. Cabling to a "D" connector on the front of the VDU is acceptable. No rewiring to the standards 332 cabinet shall be allowed. The controller cabinet resident modules shall conform to the requirements detailed in Chapter 1 as well as Sections 5.2.8, 5.2.8.1, 5.2.8.2, 5.4.1, 5.4.5, 5.4.5, and 5.4.6, 5.5.1, 5.5.5, and 5.5.6 of the Transportation Electrical Equipment Specifications (TEES)

The VIVDS shall operate from 95 to 135 VAC service per NEMA TS-1. The VIS sensor assembly, excluding the heater circuit, shall draw less than 10 watts of power. The power supply or transformer for the VIVDS shall meet the following minimum requirements:

Item	Power Supply	Transformer
Power Cord	Standard 120VAC, 3 prong cord, at least 1 meter in length (may be added by Contractor)	Standard 120VAC, 3 prong cord, at least 1 meter in length (may be added by Contractor)
Type	Switching mode type	Class 2
Rated Power	Two time (2x) full system load	Two time (2x) full system load
Operating Temperature	-35 deg C to 74 deg C	-35 deg C to 74 deg C
Operating Humidity Range	From 5 percent to 95	From 5 percent to 95
Input Voltage	From 90 V to 135 VAC	From 90V to 135 VAC
Input Frequency	60 Hz +/- 3 Hz	60 Hz +/- 3 Hz
Inrush Current	Cold start, 25 A max. at 115 V	N/A
Output Voltage	As required by the VIVDS	As required by the VIVDS
Overload Protection	From 105 percent to 150 percent in output pulsing mode	Power limited at >150%
Over Voltage Protection	From 115 percent to 135 percent of rated output voltage	N/A
Setup, Rise, Hold Up	800ms, 50ms, 15ms at 115VAC	N/A
Withstand Voltage	I/P-0/P:3kV, I/P-FG:1.5kV, for 60 sec.	I/P-0/P:3kV, I/P-FG:1.5kV, for 60 sec
Working Temperature	Not to exceed 70°C@30% load	Not to exceed 70°C@30% load
Safety Standards	UL 1012, TUV EN60950	UL 1585
EMC Standards	EN55022 Class B, EN61000-4-2, 3, 4, 5	N/A

Transient protection that complies with IEEE Standard 587-1980 Category C shall be included for all field terminated circuits. Video connections shall be isolated from ground.

Equipment, parts and support equipment required by the Engineer for acceptance testing shall be new and conform with the manufacturer's recommendations. The date of manufacture, as shown by date codes or serial numbers of electronic circuit assemblies, shall not be older than six months from the scheduled start date of this installation. No substitutions of materials shall be allowed that deviate from the list of materials approved by the Engineer.

Construction

The Contractor may be required to perform a field demonstration of the VIVDS at a particular site selected to approximate the conditions under which the system will need to operate for the project. During the demonstration the unit must prove it can meet the requirements of this SSP. The engineer has the right to reject the material if the demonstration fails to show the device compliant.

Provide personnel skilled in the physical installation of video detection including selection of correct camera locations, the right cabling and connector connection as well as zone design, VIVDS set-up and calibration. Conduct a site analysis of each installation and provide a written recommendation for optimum camera placement prior to installation.

Provide the number of video image sensors (VIS) to cover vehicle detection for every approach shown on the plans. Install the corresponding Video Detection Units (VDU) in a State Furnished Model 170E or Model 2070 controller and cabinet. Install the VIS power supply or transformer on a standard DIN rail using standard mounting hardware and wire power conductors to DIN rail mounted terminal blocks in the controller cabinet as directed by the Engineer.

Wire each VIS sensor assembly to the controller cabinet with a connectorized wiring harness that includes all power and control wiring as well as coaxial video cable and attach with standard Mil Type and rated plugs. The cable type and wire characteristics shall meet the manufacturer's recommendations for the respective VIS to cabinet distances of the project. Run wiring and cables continuously (without splices) between the VIS sensor and controller cabinet. Coil a minimum of two meter slack in the bottom of the controller cabinet or as directed by the Engineer. Terminate the serial data communication output conductors at TB-0, and continue for

a minimum of three meters to a DB9F connector for setup and diagnostic access. Coil and tape the ends of unused and spare conductors to prevent accidental contact to other circuits. Label conductors inside the cabinet for the functions as depicted in the approved detailed diagrams.

Adjust the lens to view 110% of the largest detection area dimension. Create the detection zones or elements to meet the performance requirements of this SSP. Logically combine zones or elements into reporting contact outputs that are equivalent to the detection loops shown on the plans with the detection accuracy required by this specification.

Verify the performance of each unit individually and submit the recorded medium and other materials to the Engineer at the conclusion of the performance test. The accuracy of each unit shall be determined and documented so that each unit may be approved or rejected separately by the Engineer. Failure to submit the materials at the conclusion of testing invalidates the test. The recorded media serves as acceptance evidence and shall not be used for calibration. The calibration shall have been completed prior to testing and verification.

Verify the limit line presence detection accuracy by comparing the VIVDS performance to observations of recorded video images for the same period. Record time stamped video images with superimposed vehicle presence detection and count indication and transfer the images for the selected analysis periods to a DVD or CD media for viewing on a PC. Video record each approach for two sixty minute periods that span dusk and dawn, separately covering the day to night and night to day transitions and including no less than 250 vehicles for each approach and each test period. Provide all software needed for image conversion and analysis. The Contractor shall make a copy of the recording medium for the Contractor's use.

Presence detection accuracy shall be based on the observed operation of the detection contact outputs where such outputs can be logical combinations of several detection zones or elements. Detection errors shall be defined as follows:

#	Error	Description
1	False Detection	When an output reports a vehicle presence when no vehicle is observed
2	Failure to Detect	When a vehicle is present in the zone or at the limit line and the output fails to report a presence
3	Drop After Detection	When a vehicle is initially detected but the output report is dropped while the vehicle remains present.

The presence detection accuracy for an approach shall be determined by the formula $100(1 - \{NE/TC\})$ where TC = the Traffic Count observed from the media recording for the period, and NE = Net Errors observed over the same period. Net errors are obtained by adding the number of observed false calls (error 1 above) while subtracting the number of missed vehicle events and dropped vehicle presence events (errors 2 and 3 above) for each period. The $\{NE/TC\}$ shall be an absolute value. The VIVDS shall not indicate more than 5% in false vehicle readings(error 1 above), not miss the detecting of more than 3% of the vehicles present (errors 2 and 3 above) and the resulting presence detection accuracy shall be at least 98 percent.

The VIVDS vehicle count accuracy shall be determined by the formula $100(1 - DC/TC)$ where DC = the Detector Vehicle Count and TC = the Traffic Count observed from the media recording for the period. Vehicle count accuracy shall be better than 95 percent for each test period.

The Engineer will review the data findings and accept or reject the results within 7 days. Determination of any vehicle anomalies or unusual occurrences will be decided by the Engineer. Data or counts that are not agreed upon by the Engineer shall be considered errors and count against the unit's calibration. If the Engineer determines that the VIVDS does not meet the performance requirements, the Contractor will have seven days to re-calibrate and re-test the unit and re-submit new test data. Following three failed attempts, the Contractor shall replace the VIVDS system with a new unit.

The Contractor shall notify the Engineer 15 working days before the unit is ready for acceptance testing. Acceptance testing shall be scheduled to be accomplished before the end of the normal work shift. The contractor shall demonstrate the operation of all VIS cameras and VDU units satisfy the functional requirements of these special provisions.

Provide all equipment, documentation, materials and personnel required for acceptance testing of the system. Provide the Engineer with a spare of any special tools needed for the acceptance testing, operation and maintenance of the system. Provide programming and software required to support the VIVDS system, installed in the appropriate equipment at the time of acceptance testing, and used for the acceptance test.

Training

Provide a minimum of ____ hours of training by a factory authorized representative for up to ____ students selected by the Engineer. The content of the training shall include instruction on how to align, program, adjust, calibrate and maintain the unit. Provide all materials and equipment for the training. Give the Engineer 15 working days notice prior to the training. The training time and location shall be agreed upon by the Engineer and the Contractor. If no agreement can be reached, the Engineer shall determine the time and location.

Payment

The VIVDS will be paid for on a lump sum basis. Payment for any and all equipment and labor including conduits, conductors, trenching, support and overhead shall be held until the Engineer accepts the accuracy results for each location. Each VIVDS system shall be weighed individually, that is, one location may be accepted and paid while others are pending. The payment for any and all testing is included in the bid price, and no additional payment will be allowed for additional testing that results from the re-testing of failed units.

10-3.21 LUMINAIRES

Ballasts shall be the lag type. Ballast types for decorative light and pedestrian walkway light are shown on plans.

10-3.22 SOFFIT AND WALL LUMINAIRES

A No. 7 pull box shall be installed adjacent to each soffit luminaire as shown on the plans.

10-3.23 SOFFIT AND WALL LUMINAIRES – METAL HALIDE

Metal Halide soffit luminaires shall conform to the provisions for soft and wall luminaires in section 86-6.03, "Soffit and Wall Luminaires," of the Standard Specifications and elsewhere in these Special Provisions.

Metal Halide soffit luminaires shall be installed on the City circuit shown on the project plans at 2nd Street UC and 3rd Street UC only. All other soffit luminaires shall be the high-pressure sodium type.

10-3.24 SIGN LIGHTING FIXTURES-INDUCTION

Induction sign lighting fixtures shall conform to the provisions for mercury sign lighting fixtures in Section 86-6.05, "Sign Lighting Fixtures-Mercury," of the Standard Specifications and these special provisions.

Each fixture shall consist of a housing with door, a reflector, refractor or a lens, a lamp, a power coupler, a high frequency generator and a fuse block.

Fixtures shall have a minimum average rating of 60 000 hours. Fixtures shall be for a wattage of 87 W, 120/240 V(ac). The power factor of the fixtures shall be greater than 90 percent and the total harmonic distortion shall be less than 10 percent. Fixtures shall be Underwriter's Laboratories (UL) approved for wet locations and be Federal Communications Commission (FCC) Class A listed.

The mass of the fixture shall not exceed 20 kg. The manufacturer's brand name, trademark, model number, serial number and date of manufacture shall be located on the packaged assembly and permanently marked on the outside and inside of the housing.

MATERIALS

Mounting Assembly

The mounting assembly may be either cast aluminum, hot-dip galvanized steel plate or steel plate that has been galvanized and finished with a polymeric coating system or the same finish that is used for the housing.

Housing

Housings shall have a door designed to hold a refractor or lens. Housing doors shall be designed to be opened without the use of tools. Housings and doors shall have a powder coat or polyester paint finish of a gray color resembling unfinished fabricated aluminum.

Reflector

Reflectors shall be designed to be removed as a unit that includes the lamp and power coupler.

Refractor

Refractors or lenses shall have smooth exteriors. Lenses shall be flat or convex. Convex lenses shall be made from heat resistant, high-impact resistant, tempered glass.

Convex lenses shall be designed or shielded so that no fixture luminance is visible when the fixture is approached directly from the rear and the viewing level is the bottom of the fixture. When a shield is used it shall be an integral part of the door casting.

Lamp

Each fixture shall be furnished with a 85-W induction lamp. Interior lamp walls shall be fluorescent phosphor coated. Lamp light output shall be at least 70 percent at 60 000 hours. Lamps shall have a minimum color-rendering index of 80. Lamps shall be rated at a color temperature of 4000 K. Lamps shall be removable without the use of tools.

Power Coupler

Power couplers shall consist of a construction base with antenna, heat sink and electrical connection cable.

The power coupler shall be designed so that it can be removed with common hand tools.

High Frequency Generator

High frequency generators shall start and operate lamps at an ambient temperature of -25 °C or greater for the rated life of the lamp.

Generator output frequency shall be 2.65 MHz \pm 10 percent. The generator radio frequency interference shall meet the requirements of the Federal Communications Commission Title 47, Part 18, regulations concerning harmful interference.

High frequency generators shall operate continuously at ambient air temperatures from -25 °C to +25 °C without reduction in generator life. High frequency generators shall have a design life of at least 100 000 hours at 55 °C.

High frequency generators shall be capable of being replaced with common hand tools. Conductor terminals shall be identified as to the component terminal to which they connect.

High frequency generators shall be mounted to use the fixture upon which they are mounted as a heat sink.

A Certificate of Compliance conforming to the provisions in Section 6-1.07, "Certificates of Compliance," of the Standard Specifications, and a copy of the high frequency generator test methods and results shall be submitted by the manufacturer with each lot of fixtures. The certificate shall state that the high frequency generators meet the requirements of this section and the generator specifications of the lamp manufacturer.

10-3.25 INTERNALLY ILLUMINATED SIGNS

The "METER ON" sign shall be a Type A pedestrian signal modified so that the reflector shall be a single chamber with 2 incandescent lamps.

The message shall be white "METER ON" as shown on the plans. White color shall be in conformance with the provisions in Section 86-4.06, "Pedestrian Signal Faces," of the Standard Specifications.

Lenses shall be 4.8-mm, minimum thickness, clear acrylic or polycarbonate plastic or 3-mm nominal thickness glass fiber reinforced plastic, with molded, one piece, neoprene gasket. Message lettering for "METER" shall be "Series C," 113 mm high, with uniform 13-mm stroke, and for "ON" shall be "Series C," 150 mm high, with uniform 25-mm stroke. Letters shall be clear, transparent or translucent, with black opaque background silk screened on to the second surface of the lens.

10-3.26 PHOTOELECTRIC CONTROLS

Contactors shall be the mechanical armature type.

Photoelectric units for illuminated signs shall have a "turn-on" level of between 215 lux and 323 lux (corresponds to a switching level of approximately 430 lux to 646 lux measured in the horizontal plane). "Turn-off" level shall not exceed 3 times the "turn-on" level.

Photoelectric controls shall be the time delay type, requiring a minimum of 50 seconds of exposure to actuate.

10-3.27 MODEL 500 CHANGEABLE MESSAGE SIGN SYSTEM

JMF 09/02/19

Model 500 changeable message sign (CMS) systems consist of a Model 500 changeable message sign, a Model 170 controller assembly in a completely wired Type 1 or similar cabinet and the required wiring and auxiliary equipment required to control the CMS shown on the plans and in conformance with these special provisions.

JMF 09/02/19

The Model 500 changeable message signs, wiring harness and Model 170 controller assembly including controller unit and completely wired cabinet, but without anchor bolts, will be State-furnished in conformance with the provisions in "Materials" of these special provisions.

JMF 09/02/19

Model 500 changeable message sign system components will conform to the requirements in "Specifications for Changeable Message Sign System," issued by the State of California, Department of Transportation, and to the addenda thereto current at the time of project advertising. Model 170 controller assemblies will conform to the requirements in "Traffic Signal Control Equipment Specifications," issued by the State of California, Department of Transportation, and to the addenda thereto current at the time of project advertising.

Attention is directed to "Sign Structures" of these special provisions.

The sign assembly shall be installed on the sign structure. The controller cabinet foundation shall be constructed as shown on the plans for Model 334 cabinets (including furnishing and installing anchor bolts), the controller cabinet shall be installed on the foundation, and the field wiring connections shall be made to the terminal blocks in the sign assembly and in the controller cabinet.

Field conductors No. 12 and smaller shall terminate with spade terminals. Field conductors No. 10 and larger shall terminate in spade or ring terminals.

A listing of field conductor terminations, in each State-furnished changeable message sign and controller cabinet, will be furnished free of charge to the Contractor at the site of the work.

The location of the foundation for each controller cabinet will be determined by the Engineer.

State forces will maintain the sign assemblies. The Contractor's responsibility shall be limited to conformance with the provisions in Section 6-1.02, "State-Furnished Materials," of the Standard Specifications.

10-3.28 REMOVING, REINSTALLING OR SALVAGING ELECTRICAL EQUIPMENT

Salvaged electrical materials shall be hauled to 175 Cluster Street San Bernardino, CA. 92408 and stockpiled.

The Contractor shall provide the equipment and personnel, as necessary, to safely unload and stockpile the material. A minimum notice of 2 business days shall be given prior to delivery. Deliveries shall be made between the hours of 8:00 AM and 3:00 PM, Monday through Friday. No deliveries will be accepted on weekends or holidays.

10-3.29 DISPOSING OF ELECTRICAL EQUIPMENT

Fluorescent light ballasts which contain polychlorinated biphenyls (PCBs) shall be disposed of in conformance with the California Department of Toxic Substances Control (DTSC) Regulations set forth in Title 22, Division 4.5, Chapter 42, of the California Code of Regulations.

Ballasts and transformers that contain polychlorinated biphenyl (PCB) are designated as extremely hazardous wastes and fluorescent tubing and mercury lamps are designated as hazardous wastes under Title 22, Division 4.5, Chapter 11, Article 4.1 and Article 5, of the California Code of Regulations.

The State assumes generator responsibility for these wastes. The Engineer will prepare the Hazardous Waste Manifest for Shipment. Ballasts shall be packaged and transported to a hazardous waste disposal facility. The Contractor shall package and transport fluorescent lights to an appropriately permitted facility.

PAYMENT

Full compensation for hauling, stockpiling, and disposing of transformers, fluorescent tubing and mercury lamps and non-leaking fluorescent light ballasts shall be considered as included in the contract price paid for the various items of work and no additional compensation will be allowed therefor.

10-3.30 CLOSED CIRCUIT TELEVISION SYSTEM

GENERAL

Closed circuit television (CCTV) system shall conform to all rules and regulations of the Federal Communications Commission, and shall conform to the provisions in Section 86, "Signals, Lighting and Electrical Systems," of the Standard Specifications and these special provisions.

Each CCTV system shall consist of a camera pole, CCTV camera assembly and CCTV cabinet assembly.

The CCTV System shall include the installation and testing of all components (Camera, Environmental Enclosures, Positioning Unit, Camera Control Unit, Power Supplies, and associated cables). All items of the CCTV System shall be Contractor-furnished.

The CCTV System shall be installed as a complete and operational system.

The contractor shall be responsible for providing any mounting adapter and/or attachment required for installation of the CCTV Camera System. All materials furnished, assembled, fabricated or installed under this item shall be new, corrosion resistant and in strict accordance with the details shown on the plans and in the specifications.

The Contractor shall be responsible for all deliveries. Contractor shall provide submittals for equipment specified in these special provisions for approval by the Caltrans Engineer.

All components of the CCTV System, except the cameras, shall have a minimum one-year manufacturer's warranty for parts and labor. The cameras shall have a minimum of a one-year manufacturer's warranty for parts and labor to begin from installation acceptance with additional two years extended warranty. The Resident Engineer and the CCTV Camera System vendor representative shall verify the installation acceptance date.

CAMERA POLE

Sheet steel shall have a minimum yield of 331 MPa. Modifications for hand hole, connector bracket and strain relief shall be made as shown on the plans.

CLOSED CIRCUIT TELEVISION (CCTV) CAMERA ASSEMBLY

Closed circuit television (CCTV) camera assembly shall consist of the following:

- 1 - CCTV camera.
- 1 - Camera lens.
- 1 - Environmental enclosure.
- 1 - Pan and tilt drive unit.

The Contractor shall perform a functional test to verify that the unit works in accordance with the manufacturer's specifications before installing the assembly. The Contractor shall

provide details of the camera and operational elements to the Engineer with the material submittals.

CCTV Camera

Functional Capabilities

The video camera shall be capable of dual mode operation, day (color) and night (monochrome) capabilities with optical zoom lens and a high speed positioning system. The lens shall have a focal length of 3.6 mm to 82.8 mm (23:1) with auto/manual focus. The video camera shall have a digital zoom range of up to 10X and provide an effective overall zoom ratio of 230:1. The effective focal length is 3.6 mm to 828 mm. The image sensor and lens combination shall consist of a 6.35 mm format Progressive Scan CCD resulting in an effective horizontal angle of view of 54° wide angle to 0.25° maximum telephoto. The camera shall provide Wide Dynamic Range (WDR) by use of dual shutter exposure technique. The pan function shall provide 360° of continuous rotation, with a variable speed from 0.1° per second to 100° per second. The tilt function shall provide 130° of movement (0° to +40° to -90°, with a variable speed from 0.1° per second to 60° per second. Up to 64 presets shall be available for storing and recalling zoom, pan and tilt positions. The Positioner shall be capable of a tour sequence defined using up to 64 preset positions. All camera and pan & tilt functions shall be operable via RS-422 serial communications. Communications protocol command set shall be public domain.

The CCTV camera shall meet the following requirements:

- 6.35 mm Progressive Scan Color Sensor
- Horizontal Resolution of 470 TV Lines
- 23:1 (3.6 mm to 82.8 mm) optical zoom lens
- Continuous digital zoom with selectable range from OFF to 10X
- Effective overall focal length of 3.6 mm to 828 mm
- 2 possible zoom speeds
- Auto/Manual Focus
- Selectable long-term integration to 1/4 second with frame store video output
- Selectable shutter speeds from 1/60 second to 1/30,000 second
- Composite video output; NTSC format
- Adjustable color balance
- Crystal and/or Internal phase adjust line-lock, software adjustable
- Programmable on screen character generator
- Wide Dynamic Range (WDR) by use of dual shutter exposure technique
- RS-422 serial control protocol command set to be public domain
- Camera Addressing via serial control
- Internal Heater
- Camera case (88.9 mm diameter) shall be a sealed enclosure pressurized with dry nitrogen
- Camera rotation capability shall be continuous in either direction
- Variable pan speed from 0.1°/sec. to >100°/sec. (Preset Mode)
- Variable tilt speed from 0.1°/sec. to 60°/sec
- 64 zoom, focus, pan & tilt preset positions, each with a unique user programmable preset ID

Imager: Interline transfer Progressive Scan CCD with mosaic-type color compensating filter.

Image Area: 6.35 mm Format of 3.6 mm (H) x 2.7 mm (V)

Resolution: 470 horizontal; 350 vertical

Elements: 758 (H) x 504 (V)

Video Output: NTSC, 1 V p-p @ 75 ohms, unbalanced

Camera Lens

The camera lens shall meet the following requirements:

Maximum Lens Aperture: f/1.6 (wide) to f/3.6 (telephoto)

Optical Zoom Range: 23X, 3.6 mm to 82.8 mm

Digital Zoom Range: 1X (Off) through 10X, Smooth transition from Optical to Digital Zoom

Effective Digital Focal Length: 82.8 mm to 828 mm

Optical Zoom Speed: Two speeds, from approximately 2.9 seconds to 5.8 seconds full range

Horizontal Angle of View: Optical: 54° to 2.5°; at 10X Digital: 54° to 0.25°

Minimum Focus Distance: 1 m in telephoto, 0.01 m in wide angle

Auto Focus: Selectable Auto/Manual

Minimum Scene Illumination for Reliable Auto Focus, 30% video

Manual Focus Speed: One speed, approximately 2.0 seconds to full range

Zoom & Focus Presets: 64 preset positions, focus is auto, if programmed, shall display the Preset ID

Flash Memory: Update firmware and new features via serial communication

Long Term Integration Range: (Short Shutter) shall provide manual selection of integration duration for enhanced sensitivity. Integration times are: 1/4 second, 1/2 second, 1/8 second, 1/15 second, 1/30 second. Frame Store video output shall provide continuous video output, updated at the integration rate.

Manual shutter speeds of 1/60; 1/120; 1/180; 1/250; 1/500; 1/1,000; 1/2,000; 1/4,000; 1/10,000; 1/30,000 second

Auto Iris - Iris automatically adjusts to compensate for changes in scene illumination to maintain constant video level output within sensitivity specifications

Manual Iris - The effect of open iris/close iris shall be accomplished by changing the video level. To give the effect of open iris, a decrease in the video level value shall change and to give the effect of close iris an increase in the video level shall change

Gamma: 0.45

Automatic Gain Control (AGC): 0 to 28 dB

Color Balance: Auto Tracking Color Balance/Manual with adjustable Red and Blue Levels

Signal to Noise Ratio: Greater than 50 dB

Synchronization: Crystal or Phase-Adjust Line Lock on 60 Hz

Sensitivity: (3200K): Scene Illumination @ F1.6, Wide Angle

3.0 Lux @ 1/60 s, F1.6, Shutter, Color I.R. Cut On

0.2 Lux @ 1/4 s, F1.6, Shutter, Color I.R. Cut On

0.3 Lux @ 1/60 s, F1.6, Shutter, monochrome mode I.R. Cut Off

0.02 Lux @ 1/4 s., F1.6, Shutter, monochrome mode I.R. Cut Off

Environmental Enclosure

The camera enclosure shall be a corrosion resistant and tamperproof sealed and pressurized housing with 34.475 kPa dry nitrogen with Schrader purge fitting and 137.9 kPa relief valve for each camera. The size of the housing shall be 89 mm diameter or smaller.

The camera housing shall include a loss of pressure sensor that will trigger an alarm message that will be inserted in the video output signal when the pressure drops below 3.45 kPa .

The enclosure shall be constructed from 6061-T6 standard aluminum tubing with a wall thickness of $6.35 \text{ mm} \pm 0.76 \text{ mm}$. Internal components shall be mounted to a rail assembly. A copper plated spring-steel ring shall be used to ensure electrical bonding of the rail assembly and components to the camera housing. The housing exterior shall be finished by pre-treatment with conversion coating and baked enamel paint. The camera enclosure shall be designed to withstand the effects of sand, dust, and hose-directed water.

The internal humidity of the housing shall be less than 10%, when sealed and pressurized. Desiccant packs shall be securely placed inside the housing to absorb any residual moisture and maintain internal humidity at 10% or less.

A sun shield shall be provided to shield the entire housing from direct sunlight.

Mechanical Specifications (DSP camera assembly)

The mechanical specifications shall meet the following requirements:

Weight: 1.9 kg .

Dimensions:

Length (less connectors): 305 mm

Housing Diameter: 89.9 mm

Height (Including mounting base): 130.3 mm

Mounting: Four (4) mounting holes shall be 10 mm to 11 mm in diameter and match the bolt pattern as detailed in sheet ES-16A (Camera Mounting Plate) as found in the Standard Plans.

Pan and Tilt Drive Unit

The following are the requirements for the Pan and Tilt Positioning or the CCTV camera:

Must be capable of continuous rotation in either direction.

Tilt movement shall be 130° , $+40^\circ$ to -90° unobstructed.

Pan Speed (Operator Control) shall be variable from $0.1^\circ/\text{s}$ to $40^\circ/\text{s}$

Pan Speed (Preset Control) shall be greater than $100^\circ/\text{s}$

Tilt Speed (Operator Control): Variable from $0.1^\circ/\text{sec.}$ to $20^\circ/\text{s}$

Tilt Speed (Preset Control): $40^\circ/\text{s}$

The 64 Pan & Tilt preset positions shall be repeatable within $\pm 0.5^\circ$

Tour Specifications

The following are the requirements for tour sequencing:

Eight - tour sequence may be defined.

Programming of the tour sequences shall be accomplished by the selection of a preset position (by number), and then selection a dwell time. The presets can be used in any order, and the same preset may be used more than once as long as the total number of preset positions used does not exceed 32.

The dwell time defines the length of time paused at each preset position. It can be from 1 second to 60 seconds. The dwell time is can be changed individually for all stops on the tour.

If the appropriate preset ID is programmed, it shall be displayed for each preset position used on the tour.

The tour shall stop upon receipt of a pan command.

All programmable functions shall be stored in non-volatile memory.

Power Requirements:

Operating voltage shall be 108 V(ac) to 132 V(ac), 120 V(ac) Nominal 50/60 Hz. (± 3.0 Hz).

Power consumption shall not exceed a total of 95 Watts.

Camera/receiver/P&T driver (pan & tilt in motion) power not to exceed 40 Watts.

Power for the heater (heater on) shall not exceed 6 Watts.

Environmental Specifications:

Ambient operating temperature limits shall be -40°C to $+55^{\circ}\text{C}$

Ambient storage temperature limits shall be -45°C to $+65^{\circ}\text{C}$

Relative humidity shall be up to 100% (per MIL-E-5400T, paragraph 3.2.24.4) IP 66 Rating.

The equipment shall withstand exposure to sand, dust, fungus, and salt atmosphere per MIL-E-5400T, paragraph 3.2.24.7, 3.2.24.8, and 3.2.24.9.

The equipment shall withstand shock up to 5G's, 11ms, in any axis under non-operating conditions per MIL-E-5400T, paragraph 3.2.24.6.

The equipment shall withstand sine vibration from 5 to 60 Hz with 0.021mm total excursion without damage. The equipment shall also withstand random vibration from 60 to 1000 Hz, 5 G's RMS without damage.

Mechanical Specifications

The weight shall not exceed 12.7 kg

The dimensions shall not exceed 432 mm height and 279.5 mm width.

Main Interface Connector

The main interface connector shall be equivalent to an Amphenol 206036-3 with back shell 206070-1 and mating connector equivalent to an Amphenol 206037-11 with clamp 206070-1.

Backward Compatibility With Mpc-M-100/104/105 Master Controller

The Camera Positioning System shall be compatible with existing MPC Masters, providing the following control:

Address Selection: Same on Camera Positioning System.

Camera Power ON/OFF: Camera turns on/off.

Auto / Manual Iris Select: Same on Camera Positioning System.

Fast / Slow: Provides two speeds for Zoom.

Auto / Manual Color Balance Select: Auto / Manual shutter Select on Camera Positioning System.

BLUE: Increases blue level.

RED: increases red level.

ZOOM: Same on Camera Positioning System.

FOCUS: Focus Control if in Manual focus mode, No effect if in auto focus mode.

IRIS: Iris Control if in Manual iris, No effect if in auto iris.

PAN / TILT: Controls Pan & Tilt direction. Speed of Pan & Tilt is determined by Fast / Slow mode selection and by optical zoom position of lens, so that the narrower the field of view the slower the pan & tilt speed. In the fast mode, the pan speed shall be adjusted to provide approximately 1 1/2 to 2 1/2 fields of view per second. In the slow mode the pan speed shall be adjusted to provide approximately 1/2 to 1 field of view per second. The tilt speed shall be adjusted to remain proportional to the pan speed.

Presets

Allows Presets 1 through 10 to be set or recalled. Selecting presets 1-10 shall control presets 33 through 42 stored in Camera Positioning System.

Privacy Zones

Video blanking for up to 8 Privacy zones shall be provided. The video shall be blanked out for privacy of 1 line; numeric messages can also be displayed. Message shall be displayed in “blinking” or “non-blinking” mode and be enabled or disabled. Privacy Zones shall be programmed via the RS422 serial communications.

Communication And Camera Addressing Protocol

Control and addressing shall be via RS422 optically isolated serial communications. Refer to Camera Positioning System Protocol for detailed description. Camera Positioning System protocol shall be public domain.

Upon receipt of any given command, the Camera Positioning System shall not take longer than 1.0 second to respond.

All programmable functions shall be stored in non-volatile memory and shall not be lost if a power failure occurs. System configurations such as video privacy zones, preset text and sector I.D. shall be able to be stored in a computer file and a camera personality can be cloned or uploaded into a camera in the event that a camera replacement is necessary.

The communications transmission interface shall be terminated with appropriate connector. If required a converter shall be supplied to transform EIA-422 to EIA-232.

CCTV CABINET ASSEMBLY

Each Model 334-CCTV cabinet assembly shall consist of the following:

- A. One CCTV cabinet.
- B. One multiple outlet strip - rack mount.
- C. Interconnect wiring.
- D. One camera transceiver (TCVR) transmitter.
- E. One interconnect and termination unit- rack mount (ITU).
- F. RS-232 to RS 422 converter

CCTV cabinet shall consist of the following per Caltrans Design Engineer approval:

- A. Contractor Furnished Model 334 Cabinet

Contractor Furnished Model 334 Cabinet

All necessary mounting hardware and wiring, foundation and anchor bolts and other equipment, as shown on the plans and specified in these special provisions

The housing and the mounting cage shall conform to those of the Model 334 cabinet provisions of the "Transportation Electrical Equipment Specifications" (TEES) issued by the State of California, Department of Transportation, and to all addendum thereto current at the time of project advertising. Police panel however, is not required.

Foundations for Model 334-CCTV cabinet housing shall conform to the details on Standard Plan ES-3C for Model 332 and 334 Cabinets.

The power distribution assembly shall consist of the following: one 30 A, 120 V minimum, single pole main breaker; three 15 A, 120 V minimum, single pole secondary breakers; eight standard 120 V(ac) receptacles; and one duplex, 3 prong, NEMA Type 5-15R grounded utility type outlet. The power distribution assembly shall protect the equipment powered by the assembly from power transients. Over voltage protection shall be provided for the power distribution assembly and shall contain as a minimum, a surge arrestor, which shall reduce the effect of power line voltage transients and be rated as follows:

Recurrent Peak Voltage	184 V
Energy Rating (Minimum)	20 J
Power Dissipation, Average	0.85 W
Peak Current for pulses less than 7 microseconds	1250 A
Stand-by Current for 60 Hz Sinusoidal	1 mA or less

The thermostatically controlled fan shall provide 4.25 cubic meter per minute of ventilation. The fan shall be activated when the temperature inside the cabinet exceeds 24°C and shut off when the temperature is less than 18°C. All vents shall be filtered.

All cabinet assemblies shall be tested to demonstrate the correct function of all controls in the presence of the Engineer.

Surge Protection.--The Contractor shall furnish and install AC Protection unit in the Model 334-CCTV cabinets with the following specifications:

The unit shall have diagnostic circuitry and diagnostic lamps indicating:

LINE OK

LINE FAULT

PROTECTION PRESENT

Shall meet UL 1449, UL 1283 and UL 497A specifications.

The AC Protector shall be rated as follows:

Maximum Energy Absorption: 720 Joules.

High Voltage Transient Spike Suppression: Up to 36 000 A spikes.

Transient Response Time: instantaneous (0.1 ns.)

Protection Modes: All 3: H-N, H-G, N-G.

High Frequency Noise Suppression: Up to 80 dB from 50 kHz to 1,000 MHz.

Rated Current and Load Handling: 15 Amperes max. (1,800 W), 15 Amperes per socket (1,800 W) Rated Voltage: 120 V(ac), 50/60 Hz.

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Circuit Breaker: 15 A.
Receptacles: 6 (NEMA 5-15R).
Cord: 2 m (78.74 inches) with grounded 3-prong plug.
Dimensions: 44.45 mm x 82.55 mm x 228.60 mm.
Weight: 1.36 kg.
Product Warranty: Lifetime.

Dataline Protection

Clamping Voltage: 200 Volts peak \pm 10 percent
Response Time: 5 ns nanoseconds
Energy Rating: 90 Joules
Peak Transient Input Voltage: 6000 Volts, 10 microseconds
Output: RJ 11 modular jack

Full compensation for Model 334 Cabinet shall be considered as included in the contract lump sum price paid for CCTV system at the locations involved and no separate additional compensation will be allowed therefore.

Camera Transceiver

The Contractor shall furnish and install camera transceiver (TCVR) at the camera site to interface with the CCTV camera assembly, and with the fiber optic cable.

The TCVR shall operate on one singlemode fiber.

The TCVR shall support high quality, simultaneous two-way transmission of camera control data and one-way transmission of camera video over one singlemode fiber. The TCVR shall receive RS 232 data for the camera control receiver (CCR) and shall transmit NTSC video from the CCTV camera assembly.

The TCVR video transmission and data receiving format used in the camera junction box shall be compatible with the TCVR video receiving and data transmitting format used in the communications hub structure.

The TCVR may be packaged as one surface mountable module or may be individual components such as a receiver, transmitter and wavelength division multiplexer to combine both data and video onto one singlemode fiber.

Supply voltage shall be 120 V(ac) \pm 10 percent, 60 Hz. Lower voltage units will be acceptable if a UL listed power conversion module is used to adapt from the 120 V(ac) source.

Power required shall be 50 W maximum.

Mounting shall be to a flat wall surface.

Operating temperature range shall be from -20°C to +70°C minimum range.

Video transmitter section shall meet the following requirements:

Input level:	1 V peak – peak (NTSC composite)
Signal-to-Noise ratio at minimum receiver input:	50 dB minimum
Differential phase (10-90% APL):	3° maximum
Differential gain (10-90% APL):	3% maximum
Frequency response:	100 kHz to 5.5 MHz: \pm 0.30 dB maximum 5.5 MHz to 8 MHz: \pm 0.6 dB maximum

RS 232 receiver section shall meet the following requirements:

Data rate: DC to 9.6 kbps minimum.

Bit error rate: 10^{-9} maximum.

Optical shall meet the following requirements:

Video transmitter shall meet the following requirements:

Operating wavelength: 1300 nm or 1550 nm.

Launch power: -14 dBm minimum.

Sensitivity (receiver): -28 dBm maximum.

Loss budget: 14 dB minimum.

Fiber compatibility: 8.3/125 μ m singlemode.

RS 232 receiver shall meet the following requirements:

Operating wavelength: 1300 nm or 1550 nm.

Loss budget: 20 dB.

Fiber compatibility: 8.3/125 μ m singlemode.

Connectors shall meet the following requirements:

Video input: BNC.

RS 232: DB-9, DB-15 or DB-25.

Optical: Type SC.

The TCVR units shall be tested prior to installation to ensure proper operation with the camera control transmitter.

The Contractor shall confirm the operation of the TCVR, after installation, using test equipment which emulates all the functions of the camera control transmitter, and shall document all results and keep test equipment in operation until witnessed and approved by the Engineer.

The Contractor shall confirm equipment placement with the Engineer before installing any equipment.

After installing all TCVR units and the communication system, the Contractor shall demonstrate operation of the camera control system and assign all system parameters using the camera control system located at the communication hub that the CCTV is assigned to.

The camera control system functions shall be tested on all TCVR units and shall operate all remote control functions, for example pan and tilt, zoom in and out, focus near and far, set up, and recall up to eight preset positions per remote TCVR address. The response of the camera control system shall appear to be instantaneous.

The Contractor shall demonstrate the camera control system to show that it can access all TCVR units.

Testing of the Camera Transceivers.-- The Contractor shall be responsible for all testing and documentation required for proper installation and operation of the camera transceivers, materials and equipment. The following identifies the specific quality control requirements for both the TCVR and TCVR-CH. The TCVR-CH is described elsewhere.

Prior to installation all transceivers shall be tested. The Contractor shall input a standard level video test signal into the TCVR at the camera site and adjust the optical power output of the TCVR to receive a mid-range optical power level for the TCVR-CH located at the communication hub needed to produce the required video receiver output level. The TCVR-CH's video output shall then be connected to a monitor for viewing with the level adjusted to the mid-range of any output settings. The Contractor shall then qualitatively assess the monitor output. Video shall be of high quality with good color and no image ghosting. The signal-to-

noise ratio and signal-to-low frequency noise ratio shall be measured and recorded. No optical attenuation devices shall be used to reduce optical signals to required operating range. All indicators shall be verified to function correctly.

RS-232 to RS-422 Converter

The contractor shall furnish and install RS-232 to RS-485 / RS-232 to RS-422 converter, which can be used to convert any standard RS-232C port into a two-wire half-duplex RS-485 port, or a four-wire full-duplex RS-422 port and vice versa. The converter shall meet the following requirements:

Compatibility: EIA/TIA RS-232C standard and RS-485/RS-422 standard

Current Consumption: Under 10mA

Baud Rates: 300 to 115,200bps (auto-sensing and self-adjusting)

Distance: RS-232 side: 5m; RS-485/RS-422 side: Depending on power from RS-232 port, will transmit up to 1.2km at 19,200bps

Connector: RS-232 side: DB-9 Female; RS-485/RS-422 side: DB-9 Male; Termination Board: DB-9 Female and a 6-Way Terminal Block

Maximum number of drops: 128

End-of-Line Terminator: 1202 (Built-in)

Static Protection (ESD): Up to 15KV

Dimensions (H x W x D): 16 x 32 x 90 mm (with termination board)

Weight: 38 g (with termination board)

Operating Temperature: -10°C to 50°C

Operating Humidity: Up to 90% RH (no condensation)

[illegible]

CCTV ACCEPTANCE TEST PROCEDURE

Upon installation of the CCTV System in the field, the Contractor shall perform the following tests locally in the presence of the Engineer, with a Contractor provided camera controller. The camera controller can be a laptop computer with the latest version of the vendor supplied camera control software and be compatible with the CCTV System DB-9F control cable connector (to PC Com port).

A. Iris Auto//Manual Operation

- With IRIS Auto/Manual switch in Manual, open Iris and verify that the video image lightens.
- Close the Iris and verify that the video image darkens.
- Open the Iris to lighten the image and then switch IRIS Auto/Manual switch to auto. Verify that the camera iris closes to produce the original video image.
- Close the Iris to darken the image and then switch IRIS Auto/Manual switch to auto. Verify that the camera iris opens to produce the original video image.

B. Focus Auto/Manual Operation

- With Focus Auto/Manual switch in Manual, demonstrate that the camera can focus on objects both near and far in the field of view.
- Focus near, then switch FOCUS Auto/Manual switch to auto and demonstrate that the camera focus adjusts automatically to bring the image back in focus.
- Focus far, then switch FOCUS Auto/Manual switch to auto and demonstrate that the camera focus adjusts automatically to bring the image back in focus.

C. Zoom Telephoto//Wide Operation

- With the IRIS and FOCUS Auto/Manual switches in Auto the contractor shall demonstrate that the auto IRIS & FOCUS adjustments operate with a focused picture present in the video image and that the picture zooms in and out.
- With IRIS and FOCUS Auto/Manual switch in Manual and operating the Zoom from wide angle to Telephoto the Contractor shall demonstrate that all IRIS & FOCUS adjustments do not operate as if in Auto and that picture still zooms in and out.
- Demonstrate that the Digital zoom functions through 10 times the focal length.

D. Tilt Operation

The Contractor shall demonstrate that with Iris and Focus in Auto & Zoom in wide mode that the camera has free movement with a minimum of +30° to – 80° Elevation range travel.

E. Pan Right/Left Operation

The Contractor shall demonstrate that with Iris and Focus in Auto, and Zoom in wide mode and with the camera tilted at +30° to -80° the camera shall rotate with free movement, with a minimum of 360° pan travel range.

F. Camera Preset Operation

Using camera control software the Contractor shall demonstrate that the camera system shall execute a minimum of 6 various preset positions employing various degrees of zoom, pan and tilt. The camera must move freely from on preset position to the next. The camera system shall not take more than 4 seconds to go to a preset position.

Once in the preset position the camera shall not move unless directed by another command.

The camera control software shall automatically and continuously test all 6 preset positions in succession for a minimum of one hour.

G. ID Generation

Using camera ID Generator and vendor supplied camera control software the contractor shall demonstrate the insertion of 20 text characters into the video image.

H. Performance

Streaming outputs: 640x480@15FPS, 176x144@6FPS, and a 320x240-JPEG image.

A thermal monitor may be enabled to maintain the processor within the published specification.

The video output stream generated from the test archive file shall be continuous/seamless and without error/glitches when played back.

10-3.31 TRAFFIC SIGNAL ETHERNET EQUIPMENT

The traffic signal Ethernet equipment shall consist of installing the following equipment into the Model 332 cabinet as shown on the plans and per these special provisions.

Qty	Description
1	FIBER SWITCH
1	ETHERNET TO SERIAL CONVERTER

Gigabit Ethernet Fiber Switch

A self healing redundant gigabit Ethernet fiber switch shall be used at all specified locations. Industrial hardened fiber switches with two separate gigabit fiber ports using single mode one-fiber bi-directional communication, and six 10/100 Base-T Ethernet copper ports shall be provided. Each of the two fiber ports shall include a transceiver. The first fiber port shall transmit at 1550 nm and receive at 1300 nm, while the second fiber port shall transmit at 1300 nm and receive at 1550 nm. The fiber switches shall be stand-alone units installed on 19-inch rack-mounted shelves. Power options shall be 12V(dc) and 115/230V(ac). The switches shall allow for daisy-chaining and support distances between switches a minimum of 20 miles. The fiber ports shall have SC connectors and copper ports have RJ-45 female connectors. The fiber switches shall allow for an operating temperature of -40°C to 80°C and a storage temperature of -40°C to 90°C. The units shall have a maximum bit error rate of 1 in 10¹⁰.

Self healing redundant gigabit Ethernet fiber switch shall be furnished. The fiber switches will be tested by Caltrans District 8 Electrical Operations (tel. 909-383-6431) to be functional and compatible with CTNET and QuicNet central signal system software. A Web-based configuration user interface shall be provided to view and change network settings such as IP address, subnet, gateway, speed, half/full duplex, name, password and other parameters. It should also monitor the fiber ring status, alarm conditions, and fault locations for local or

remote units. The fiber switches shall provide simple network management protocol (SNMP) and provide a fault recovery within 50 ms.

Ethernet to Serial Server/Converter

Industrial hardened Ethernet to serial server/converter shall be used at all specified locations. The unit shall convert RS-232 Serial communications to and from 10Base-T Ethernet communications and provide data rates up to 57.6 Kbps. The unit shall support full RS-232 handshaking (DCD, RTS, CTS, DTR and DSR). LEDs shall be provided on the front panel for all five control signals and Sync, Activity, Power and Link. Power options shall be 12V(dc) and 115/230V(ac). Electrical connectors shall be DB-9F and terminal blocks, and 10Base-T connector shall be RJ-45F. A Web-based user interface shall be provided to view or change network settings. The Ethernet to serial server/converter units shall allow for an operating temperature of -20°C to 80°C and a storage temperature of -40°C to 90°C. The units shall be stand-alone units installed on a rack-mounted shelf.

The Ethernet to serial server/converter unit will be tested by Caltrans District 8 Electrical Operations (tel. 909-383-6431) to be functional and compatible with CTNET and QuicNet central signal system software.

Category 5 External (CAT 5E) Cable

Industrial hardened Category 5 external cable shall be used at all specified locations. Category 5E outdoor cable or approved equal shall be furnished.

Full compensation for furnishing and installing traffic signal Ethernet equipment shall be considered as included in the lump sum price paid for signal and lighting and no separate payment will be made therefore.

10-3.32 TEMPORARY FIBER OPTIC SYSTEM

The Contractor shall furnish a temporary fiber optic system plan as described in . these special provisions.

The temporary fiber optic system plan shall be submitted to the Engineer for approval within 30 days after the contract has been approved. The temporary fiber optic system plan shall consist of but not limited to a list of all material and equipment to be used. The Contractor shall also submit a set of drawings to show how the system shall be installed and maintained during construction. The temporary fiber optic system plan shall be approved, in writing by the Engineer.

The temporary fiber optic system that crosses any city street shall be installed underground, in Type 1 conduit with a minimum size of 53C.

The fiber optic cable shall be Type E (144 SM) and shall follow the specifications of fiber optic cable as written else where in these Special Provisions. A Type E cable will be installed by the Segment 3 Contractor, from Hub C at the Route 10/215 Interchange to the Transportation Management Center. The Contractor shall remove the Type E cable and re-install the Type E cable via temporary wooden poles and re-connect to the Transportation Management Center.

It is the Contractor's responsibility to maintain the temporary fiber optic system during construction. The temporary fiber optic system shown on the plans is only a guide for the Contractor.

The fiber optic system shall not be inoperative for more than 24 hours during the change over to the temporary system and not more than 8 hours during any changes of the system during construction.

The Contractor shall remove all temporary fiber optic system within 15 calendar days, once the permanent fiber optic system is accepted by the Engineer.

Payment

The contract lump sum price paid for temporary fiber optic system shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in temporary fiber optic system, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-3.33 MODIFY TRANSPORTATION MANAGEMENT CENTER ASSEMBLY

The modify transportation management center (TMC) assembly shall consist of furnishing and installing the following equipment into existing racks:

Qty	Description
2	Video Demultiplexer Demodulators

Video Demultiplexer

The video demultiplexer and the video multiplexer system components shall be from the same manufacturer and shall be fully compatible and interoperable with each other.

The demultiplexer shall be capable of providing optical reception (demultiplexing) of up to 16 channels of RS-250C baseband video via 8-bit linear pulse code modulation digital-decoding, from the communications hub to the demultiplexer unit located within the Transportation Management Center. All equipment shall have an ambient operating temperature range of 0 to +60 degrees, C, and shall be directly mountable within the existing IFS Model R3 19-Inch Card Cage Unit.

The video demultiplexer unit shall not utilize video compression techniques and shall introduce zero latency to each of the 16 received video channels, and shall not require any user-adjustments to facilitate installation or operation.

Operating Wavelength: 1300 nm., single mode
Optical Detector: PIN Photodiode
Optical Connector Type: Type SC
Operating Power: 115 VAC

LED status indicators shall be provided on the video demultiplexer unit for ascertaining the status of the following parameters:

Video sync presence for each video output channel
Optical Carrier Detect/Link-Lock
Operating Power

The 16-channel video multiplexer and demultiplexer units shall provide the following video transmission performance end-to-end with an optical path loss of 18 dB between the two units:

Video Signal-to-Noise Ratio: 60 dB, at a maximum optical path loss of 18 dB

Video Bandwidth: 5 Hz. to 6.5 Mhz.

Differential Gain: <2%

Differential Phase: <0.7 degrees

Tilt: <1%

Installation

The Video Demultiplexer system units shall be installed at the TMC as shown on plans and specified in these special provisions. The contractor shall connect the correct optical pigtail or patch cord to the optical connector on the transmitters and receivers, as well as the correct video interface cables to the demodulator inputs and demodulator outputs as specified by the equipment manufacturer. The contractor shall coordinate the physical space required by the Video demodulator with the space allocated with any other equipment. The contractor shall connect the Video Demodulator power supply to one of the 120 V (ac), 60 hz power receptacles reserved for communication equipment in the TMC. The fiber optic path for each video link shall be tested and verified in accordance with the contract prior to installing the video Demodulator. The contractor shall neatly install all drop cables together, route them along the same path and neatly secure them to the support rails in the equipment racks. No cable shall be installed with a bend radius less than the manufacture's minimum recommended bending radius.

Payment

The contract lump sum price paid for modify TMC assembly shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in modify TMC assembly, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-3.34 MODIFY COMMUNICATION HUB

MODIFY COMMUNICATION HUB-C

Modifying communication hub assembly (HUB-C) shall consist of installing the following equipment into existing racks as per plans and these special provisions.

Qty	Description
2	IFS CARD CAGE WITH DS-1 MODEMS
1	T-1 MULTIDROP COMMUNICATION SYSTEM
0	AFOM
2	RS232 DISTRIBUTION PANEL
2	TCVR-CH (Video Receiver)
2	DS1 OPTICAL MODEM/SWITCH
20	RS-232 SERIAL CABLES
1	UNINTERRUPTABLE POWER SUPPLY (UPS)

The T1/DS1 multiplexer shelf and equipment shall consist of the following equipment:

Qty	Description	Newbridge Part No.
1	T-1 shelf	90-0010-10
1	AC power shelf-Dual	90-0435-02
1	AC power shelf upgrade kit	90-0481-02
1	T1 dual card	90-0564-01
2	T1 LIM module	90-0567-01
2	Data Cards: Direct connect cards	
1	Resource Cards: DSP-3 Cards	
1	Common Control Cards: System Control Card 3	
1	Common Control Cards: General facilities card	
1	Common Control Cards: Expander card (16+)	

MODIFY COMMUNICATION HUB-H

Modifying communication hub assembly (HUB-H) shall consist of installing the following equipment into existing racks as per plans and these special provisions.

Qty	Description
1	IFS CARD CAGE WITH DS-1 MODEMS
1	T-1 MULTIDROP COMMUNICATION SYSTEM
4	AFOM
1	RS232 DISTRIBUTION PANEL
3	TCVR-CH (Video Receiver)
1	DS1 OPTICAL MODEM/SWITCH
0	UNINTERRUPTABLE POWER SUPPLY (UPS)

The T1/DS1 multiplexer shelf and equipment consist of the following equipment:

Qty	Description	Newbridge Part No.
1	T-1 shelf	90-0010-10
1	AC power shelf	90-0435-02
1	AC power shelf upgrade kit	90-0481-02
1	T1 dual card	90-0564-01
1	T1 LIM module	90-0567-01
1	Data Cards: Direct connect cards	
1	Resource Cards: DSP-3 Cards	
1	Common Control Cards: System Control Card 3	
1	Common Control Cards: General facilities card	
1	Common Control Cards: Expander card (16+)	

Also included shall be the associated power supplies and interconnect cables which shall provide T1 multiplexing and switching functions for multi-location interfacing to standard DS1 signals and remote data using RS 232 and voice communication systems as described elsewhere in these special provisions. The T1 multidrop communication system equipment shall transmit

and receive RS 232 information via optical fiber and shall provide for the ability to multidrop asynchronous RS 232 information.

Local operator control of all essential features of the T1/DS1 multiplexer equipment shall be accomplished by the use of necessary discrete front panel controls. Dual V.24/RS 232 ports for local operator control and remote Network Management System functions and/or Control/Status reporting shall be provided.

The operation of the T1/DS1 multiplexer shall not produce any electrical noise which will interfere with the operation of any other equipment when proper cables are used.

All printed circuit boards shall be of epoxy glass based material or other high quality material. All common equipment and channel unit boards shall be made to conform coating for added protection against moisture, salt, and other environmental agents.

The T1 multidrop communication system equipment shall be designed with all the circuitry mounted on plug-in cards or modules in a single equipment shelf (that shall have no active components on its backplane). Modular design is required to allow a user to configure the multiplexer equipment for specific needs by plugging in the appropriate modules and to allow field repairs to be accomplished using plug-in module replacements. The multiplexer equipment shall be expandable in increments, channel by channel, until shelf capacity is reached.

The T1 multidrop communication system equipment shall be designed for testing, monitoring, and adjustment without service interruption. Front access shall be provided for all routine adjustments normally required to be performed by field personnel.

Spare positions--the absence of channel cards from the spare shelf positions, if provided, shall not affect equipment operation nor generate alarm conditions.

RS-232 DISTRIBUTION PANEL

The RS-232 distribution panel shall be a Newbridge Networks' Model 90-0350-01 or equal to interface with existing equipment. Interface connector and cable assembly shall be as specified by the manufacturer to interface between the T1/DS1 multiplexer direct connect cards and the distribution panel. All interface connectors and/or cables between RS 232 distribution panel and T1/DS1 multiplexer shall be provided and installed by the Contractor and as recommended by the manufacturer of the T1/DS1 multiplexer.

The connectors shall be female DB25 connectors and the cable length shall be a minimum of 1 m and not more than 15 m.

RS-232 Serial Cable.—There shall be one RS-232 serial cable per asynchronous fiber optic modem to provide a link between the modems and the RS-232 Distribution Panel. The RS-232 serial cable shall meet the following requirements:

- A. Length: Minimum of 0.5 meters.
- B. Termination: DB-25p, Bare-wire for screw terminal.
- C. Conductors: Straight through DB-25 to DB-25, No. 22 AWG, THWN.
- D. Cable Jacket: Polyethylene.

ASYNCHRONOUS FIBER OPTIC MODEM

The asynchronous fiber optic modem (AFOM) shall be used as an RS-232C interface between the 170 controller and T1/DS1 multiplexer via optical link. The modem located in the communication hub shall be a rack-mounted version installed in the card cage assembly. Model

170 controller interface modems shall be stand-alone units securely fastened on a rack-mounted shelf. An LED indicator shall be provided for use in determining received optical power.

The AFOM shall be fully compatible and interoperable with the existing International Fiber Systems Inc. models D9230SC (wall mount) and D9230SC-R3 (rack mount).

The modem shall meet the following requirements:

Electrical Signaling	Per EIA RS-232 with full handshake control signals
Electrical Power	V(dc) version: +9 to +14 V(dc) @ 32 mA, nominal. V(ac) version: 115 V(ac) $\pm 10\%$, 60 Hz.
Bit Error Rate	1 in 10^9 within optical budget.
Operating Mode	Asynchronous, simplex or full duplex.
Input/Output Logic Level	I: +3.75 to +12 V. O: -3.75 to -12 V.
Input/Output Impedance	Per RS-232D
System Bandwidth	DC to 56/64 kbps
Optical Wavelength	1300 nm.
Minimum Optical Receiver Sensitivity	-30 dBm
Minimum Transmit Output Power	-10 dBm
Connectors Optical:	SC
Connectors Electrical (Data)	DB25 female
Number of fibers	2
Mechanical Size	178 mm W x 127 mm D x 25 mm H for stand-alone module.
Weight	170 g for stand-alone module, nominal.
Environmental Ambient:	
Temperature Range	-20°C to +70°C.
Storage Temperature	-40°C to +85°C.

The asynchronous fiber optic modem shall be tested as follows:

Each optical modem shall be functionally tested by looping back the optical transmit connector to the optical receive connector using a variable optical attenuator with measured optical loss of 20 dB, nominal, at 1300 nm. A test set shall be connected to the modem and set for RS-232 communications testing. A fifteen-minute test after burn-in shall be error free.

After performing the fifteen-minute bit error rate (BER) test, at least two modems shall be tested for receiver dynamic range. To do this the optical attenuation shall be increased to the point at which the data test just begins to register bit errors. The optical receive power into the modem shall be measured and recorded. The optical attenuation shall be then decreased until the data test once again registers errors. At no time shall the optical power into the receiver exceed the manufacturer's specified saturation level. The optical receive level shall once again be measured and recorded. These minimum and maximum receive levels define the modem receiver's dynamic range.

One pair of modems shall be interconnected using optical patchcords and attenuators with a loss of 20 dB, nominal, in each direction. The RS-232 interface shall be looped back on one modem and a test set connected to the RS-232 interface of the other modem. A bit error rate of less than 1 in 10^9 shall be demonstrated.

CAMERA TRANSCEIVER IN COMMUNICATIONS HUB

Camera transceiver-communication hub (TCVR-CH) shall be located in the communication hub (I) structures shall conform to the requirements of TCVRs specified for CCTV camera assemblies with the following differences:

The TVCR (video receiver) shall be fully compatible and interoperable with the exist international fiber system (IFS) model VT 4730 WDM0-R3

The TCVR-CH shall transmit RS 232 data for the auxiliary control unit (ACU) at each camera site and shall receive NTSC video from the CCTV camera assembly.

The TCVR-CH video receiving and data transmitting format used in the communications hub shall be compatible with the TCVR video transmission and data receiving format used by the TCVRs at each of the camera junction boxes.

The TCVR-CH shall be packaged as one rack unit (1 RU x 482 mm) insertable module or shall be individual rack modules such as a receiver, transmitter and wavelength division multiplexer to combine both data and video onto one optical fiber.

The TCVR-CH shall be mounted in one rack unit (1 RU x 482 mm) insertable, and have the operating temperature range between 0°C to 50°C. (minimum.)

Asynchronous F/O Modem		Model 170 Controller	
Function		Pin No.	Function
Ground	Pin 7	N	DC Ground
		H	DCD
Data Out	Pin 2	K	Rx Data
Data In	Pin 3	L	Tx Data
		J	RTS
		M	CTS
		D	+5 V(dc)

Pin J shall be looped back to pin M

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UNINTERRUPTABLE POWER SUPPLY

Four Uninterruptible Power Supply shall be furnished and installed by the Contractor at the bottom of each 482 mm equipment rack that has 120 V(ac) powered communication equipment in the communications hub structure. The Uninterruptible Power Supply shall replicate the functions and features of the Liebert GXT2-3000RT120 or equal. The Uninterruptible Power Supply shall meet the following requirements:

Power Rating	
Rating, VA	500 VA
Rating, W	350 W
Input AC Specifications	
Phase	1
Power Factor	0.97
Input Frequency, Hz	50/60
Frequency Range, Hz	40 - 70 Hz; Auto Sensing
Input Voltage Range, V(ac)	60 - 140
Input Voltage	100/110/115/120/127

Input Connections or Input Cord/Plug Type	(1.83 m-) NEMA 5-15P
General Specifications	
UPS Technology	On-Line
Battery Specifications	
Battery Test Type	Manual & Automatic
Runtime, Full Load, Watt	28 min.
Runtime, Half Load, Watt	66 min.
Recharge Time	5 Hrs to 95%
User Replaceable Battery	Yes
Battery Technology	VRLA
Output Waveform on Battery	Sinewave
Output AC Specifications	
Nominal Voltage	100/110/115/120/127 V +/- 3%
Output Waveform	Sinewave
Receptacles (b=Battery, s=Surge)	(4) NEMA 5-15R
User Interface	
Audible Alarms	Yes
Display Type	LED
Communications	
Communications Options	SNMP/RS232
Software and Cable	N/A
Software and Cable	Multilink SW & Serial Cable
Audible Alarms	Yes
Physical Data	
Color	Black
Form Factor	Racktower
Unit Height, inches (mm)	430
Unit Width, inches (mm)	87
Unit Depth, inches (mm)	547
Unit Weight, lbs. (kg)	22.2
Shipping Height, (mm)	584
Shipping Width, (mm)	269
Shipping Depth,(mm)	691
Shipping Weight, (kg)	26.2
Environmental	
Operating Temperature, Minimum _ (_C)	0
Operating Temperature, Maximum _ (_C)	40
Storage Temperature, Minimum _ (_C)	-15
Storage Temperature, Maximum _ (_C)	50
Relative Humidity	0% to 95%, Non Condensing
Operating Elevation, . (m)	Up to 3000
Sound Emission/Audible Noise	< 50dBA, at 1 meter
Cooling	Fan Cooled
Options	
Optional Items	External Battery Cabinets
Agency/Certification/Conformance	
Agency Approval	UL Listed, FCC Part 15, Subpart B,

Class A, UL 1778, UL Listed

Warranty

Standard

2 years UPS replacement

1 Year and 3 Year Extended Options

Extended

Available

10-3.35 T1/DS1 MULTIPLEXER

The T1/DS1 multiplexer shall replicate the T1 multiplexing, switching and diagnostic functions and features of the Newbridge Networks' Model 3600 Mainstreet Bandwidth Manager or equal. The T1/DS1 multiplexer shall provide equipment communications via a standard T1 bandwidth of 1.544 Mbps interface. The T1/DS1 Multiplexer shall support voice, RS 232, V.35, RS-449/X.21/RS-422, X.27, V.11, V.24, V.28 communications with standard data rates of 1.2 kbps to 2.048 Mbps. Remote data on RS 232 field interconnections to the T1/DS1 Multiplexer shall be provided through the RS 232 Distribution Panels and the asynchronous fiber optic modems. The remote TOS cabinet's T1 multiplexer interconnections to the T1/DS1 multiplexer in the communications hub assembly shall be provided through the DS1 optical modem.

The T1/DS1 multiplexer and associated equipment shall meet the following standards:

FCC part 15, Subpart J, Class A device

FCC part 68

AT&T Publication 43202

AT&T Publication 43801

AT&T Publication 54016

AT&T Publication 62310

AT&T Publication 62411

UL Standard 94

UL Standard 510

UL Standard 910

UL Standard 1441

UL Standard 1581

UL Standard 1666

UL Standard 1863

The DS1 signal shall meet the following minimum electrical requirements:

1.544 Mbps \pm 200 bps line rate with stratum 4 clock
ESF and D4 Mode 3 format
24 DS0 at 64 kbps framing with 8 kbps overhead
B7, B8ZS, or AMI line coding
B8ZS clear channel
100 \pm 10 Ω balanced impedance

Front panels.-- Channel units and common equipment shall be of plug-in design each incorporating locking devices on the front face insuring proper position, without requiring unique tools to perform installation or removal. Each unit shall incorporate a label describing the card type.

Mounting.-- All equipment shall provide for a minimum of four mounting screws in order to flush mount the equipment in a standard 482 mm EIA-310 rack space, unless otherwise specified elsewhere in these specifications.

Function.-- The T1/DS1 multiplexer equipment shall provide the functions of digital cross-connect, drop and insert, channel bank, fractional T1, ISDN and integrated voice and data multiplexer in a combination of single function systems or as a combined system on a non-blocking basis and be software configurable at the DS0 level. There shall be software internal to the T1/DS1 multiplexer for diagnostics, maintenance, setup and operations.

T1 Equipment Shelf.-- The T1 equipment shelf shall accommodate all universal channel slot, common control, resource, and extender cards as described under these special provisions to configure the T1/DS1 multiplexer. The T1 equipment shelf shall be compliant with Federal Communications Commission (FCC) Class A – Type II requirements. Cable entrances shall be located at the top and bottom of the back panel. An equipment interface area shall be provided with connectors to connect to external equipment such as the RS 232 distribution panels, as described elsewhere in these special provisions. A single shelf shall be composed of 12 card slots and divided into the universal channel slot (UCS) card section and the common control card section. Eight slots shall be designated for the UCS card section and 4 slots for the common control card section. The power section shall be configured with dual redundant load sharing 120 V(ac) power supplies that meet the following requirements:

- A. Operating AC power supply voltage range from: 102 V to 132 V.
- B. Each T1/DS1 multiplexer shall have the provision to be configured with a dual internal redundant load sharing –48 V(dc) power supplies. In the event of a commercial AC power failure the T1 multiplexer shall be capable of uninterrupted operation by deriving –48 V(dc) power from a backup battery source. (Battery source not required under this contract). The T1/DS1 Multiplexer shall be convection cooled when powered by –48 V(dc). No forced-air cooling devices shall be permitted.
- C. All power and ground connectors shall be screw-terminal or UL-approved connectors. Wire-wrap post, and solder post terminals are not acceptable.
- D. Required channel card supply voltage and current levels shall be provided by terminal common equipment being distributed on the shelf backplane.

The T1 equipment shelf shall have a nominal size of 482 mm (W) x 254 mm (D) x 482 mm (H).

Backplane requirements.-- The T1/DS1 multiplexer shall be designed with shelf motherboard (backplane) connecting the channel cards and common equipment together. Specifically a wire-wrap or bundled wiring harness construction shall not be permitted.

The backplane shall be designed to support a mixture of voice and high speed data.

Crosstalk.-- The T1/DS1 multiplexer shall be designed to allow physical separation of voice and data traffic to different connectors on the backplane. High speed data lines shall not be permitted to produce crosstalk on adjacent high speed data lines.

Ringing voltage on voice lines are not permitted to produce crosstalk on adjacent high speed data lines.

Line Interface Module (LIM) T1.-- The T1/DS1 multiplexer shall fully support an integrated LIM T1 module. The LIM shall be modular to the T1/DS1 dual and single 1.544 Mbps aggregate cards. The LIM shall support the DSX-1 electrical interface and loopbacks towards the T1 line, and shall be software controllable through the T1/DS1 multiplexer. No external buttons, switches and dip switches shall be used or allowed to activate loopbacks. The integrated LIM shall meet the specifications in AT&T Compatibility Bulletin #119 Interconnection Specification for Digital Cross-Connects. The integrated LIM shall be locally powered. Span simplex power can be either looped in channel bank mode or passed through in drop and insert mode.

Network specifications:

Line Rate:	1.544 Mbps \pm 32 ppm
Line Code:	AMI and B8ZS
Frame Code:	D4 and ESF
Output Signal:	\pm 3.0 V peak to peak nominal
Impedance:	100 Ω
Input Signal:	\pm 3.0 V peak to peak nominal
Sensitivity below DSX-1:	-10 dB (0 dB = 2.4 V peak to peak)
Pre-Equalization Ranges:	0 to 45 m 46 m to 137 m 138 m to 198 m

Pulse Density specifications:

Zero suppression (software controllable):	AT&T Publications 62411
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Connector specifications:

Connector Type:	25-pair Amp Champ Connector on the backplane
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ESF Facility Data Link (FDL).-- The FDL shall meet AT&T TR publication 54016, SPRINT TS-0031, and SPRINT TS-0025. The FDL shall decode the CRC-6 error algorithms, maintain error statistic counters, and make such statistics available to the network technician. FDL reports shall include, at a minimum, current ESF error event counter report, one hour performance report and twenty-four hour performance report.

DS0 map assignments.-- The T1/DS1 multiplexer shall have at least eight internal maps to store different DS0 assignments of the channel cards. New DS0 assignments may be made in an "off-line" manner and shall not affect traffic until all the new DS0 assignments have been completed and a change of map command issued. New DS0 assignment shall be made through Simple Network Management Protocol (SNMP) or Control Packet Switching System (CPSS) protocol. Contractor shall provide the Engineer the protocol packet technical specification. DS0 maps shall be capable of handling any 24 DS0 combinations in both T1 spans simultaneously and all physical channel card slots in the channel bank. Two configured matrix maps from each T1 to T1 span shall be active simultaneously. Any physical channel card slot shall be assignable to any multiple of DS0 time slot in either T1 line.

Clock source.-- The primary clock source shall be software selectable from an internal master clock, an external master clock, or from the T1 span. If the internal source fails the programmed alternate source shall be selected automatically. The T1/DS1 multiplexer shall

accept an external master clock that provides a clock frequency from 8 kHz to 1.544 MHz in any multiple of 1600 Hz.

Universal Channel Slot Cards.-- The T1/DS1 multiplexer equipment shall support the following channel cards:

Aggregate Cards

Dual and single 1.544 Mbps T1/DS1 Cards.-- Dual and single 1.544 Mbps T1/DS1 aggregate cards shall be remotely and locally configurable via the control port, meet the DS1 electrical signal requirements and AT&T publications as specified elsewhere.

Fixed 56/64 kbps cards.-- Fixed 56/64 kbps cards shall be remotely and locally configurable via a control port and meet the following requirements:

Asynchronous

Interface types: (1) V.35, V.24/RS 232, V.36 and V.37 and (2) X.21/V.11

Modes: (1) Bi-directional - transmit on the primary or the secondary T1, (2) Point to point and (3) Polled - shared time slots CGA alarm capable.

56/64 x n kbps cards.-- The 56/64 x n kbps cards shall be remotely and locally configurable via the control port and meet the following requirements:

Synchronous

Interface types: (1) V.35, V.24/RS 232, V.36 and V.37 and (2) X.21/V.11

Modes: (1) bi-directional transmit on the primary or the secondary T1, (2) Point to point and (3) polled - shared time slots CGA alarm capable.

Data Cards

Direct Connect Cards.-- Direct connect cards shall be remotely and locally configurable via the control port and meet the following requirements:

Synchronous or Asynchronous

Interface type: V.24/RS 232

Data rates: from 150 bps to 64 kbps.

6 or more RS 232 channels per card capacity with DB-25 female connectors.

Capable of supporting a real time polling system for network management utilizing Simple Network Management Protocol (SNMP) or Control Packet Switching System (CPSS).

Subrate Multiplexer Cards.-- Subrate data multiplexer cards shall be remotely and locally configurable via the control port and meet the following requirements:

Synchronous or Asynchronous

Interface types and data rates shall support: (1) X.21 – 50 bps to 19.2 kbps (2) V.35 - 2.4 to 19.2 kbps (3) V.24/RS 232 – 50 bps to 64 kbps

DS0-A and DS0-B DDS compatible

6 or more DS0-A or DS0-B channel per card capacity

Capable of supporting a real time polling system for network management utilizing Simple Network Management Protocol (SNMP) and/or Control Packet Switching System (CPSS).

Voice Cards

E&M 4-wire voice cards.-- The E&M 4-wire voice cards shall be remotely and locally configurable via the control port and meet the following requirements:

Nominal transmission levels (dBm):

Transmit: -16.0 to +7.0

Receive: -16.0 to +7.0

Frequency response from 300 to 3000 Hz:

Transmit: +0.15 to -0.15 dB

Receive: +0.15 to -0.15 dB

4-Wire impedance: 600 Ω

Return loss from 300 to 3000 Hz:23 dB

Signaling modes: standard E&M, E&M tandem loop start, and E&M tandem ground start.

Signaling types: E&M types I, II, III, and PLR types I, II.

Transmission direction: shall be selectable to either the primary or secondary T1.

VF cards shall be able to be taken out of service without dropping all other active circuits.

VF cards shall visually indicate on front panel their active, idle and ringing status.

For inventory control purposes, all cards shall report via software their serial number and revision level.

FXS 2-Wire voice cards.-- The FXS 2-Wire voice cards shall be remotely and locally configurable via the control port and meet the following requirements:

Nominal transmission levels (dBm):

Transmit: -12.0 to + 0.0

Receive: -10.0 to + 6.0

Frequency response from 300 to 3000 Hz:

Transmit: -0.25 to +0.5 dB

Receive: -0.25 to +0.5 dB

2-Wire impedance either 600 or 900 Ω with return loss:

ERL > 34 dB, minimum

SRL > 20 dB, minimum

Signaling modes to be supported: FXS, LS, GS and PLAR.

PCM μ -law voice signaling and companding conversion standards shall be supported.

Signaling types shall be loop start and ground start.

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Transmission direction shall be software selected from either the primary or secondary T1.

FX0 2-Wire voice cards.-- The FX0 2-Wire voice cards shall be remotely and locally configurable via the control port and meet the following requirements:

Nominal transmission levels (dBm):

Transmit: -12.0 to + 0.0

Receive: +10.0 to + 6.0

Frequency response from 300 to 3000 Hz:

Transmit: -0.25 to +0.5 dB

Receive: -0.25 to +0.5 dB

2-Wire impedance either 600 or 900 Ω with return loss:

ERL > 28 dB, minimum

SRL > 20 dB, minimum

Signaling modes to be supported: FX0, LS and GS

PCM μ -law voice signaling companding conversion standards shall be supported.

Signaling types shall be loop start and ground start.

Transmission direction shall be software selected from either the primary or secondary T1.

Order wire voice cards.-- The Order wire voice cards shall be remotely and locally configurable via the control port and meet the following requirements:

Nominal transmission levels (dBm):

Transmit: -12.0 to +0.0

Receive: -10.0 to +6.0

Frequency response from 300 to 3000 Hz:

Transmit: -0.25 to +0.5 dB

Receive: -0.25 to +0.5 dB

2-Wire impedance either 600 or 900 Ω with return loss:

ERL > 28 dB, minimum

SRL > 20 dB, minimum

Signaling modes to be supported: LS, GS and PLAR.

Individual DTMF addressing from any other order wire card.

Operating modes to be supported: loop ground start operation, voice activated transmission, and tone and pulse dialing.

Telco Cards

Office Channel Unit Data Port.-- The office channel unit data port (OCUDP) shall be remotely and locally configurable via the control port and meet the following requirements:

- 4-wire baseband digital interface
- Switched 56 and DDS services shall be supported
- Bi-directional transmit to either the primary or secondary T1
- 56 kbps or 64 kbps transmission
- Switched 56 or DDS compatible with or without secondary channel (Type I)
- DDS I and DDS II compatible
- Error Correction
- Automatic Line Buildout (LBO)
- Full two mile span from line drivers.
- Automatic Equalization
- DDS loopback capability (CSU, DSU and OCU loopbacks)
- Sealing current

Transmit Only 4-Wire Voice Cards.-- The transmit only (TO) 4-wire voice cards shall be remotely and locally configurable via the control port and meet the following requirements:

Nominal transmission levels (dBm):

- Transmit: -17.5 to +13.0
- Receive: -17.0 to +8.0

Frequency response from 300 to 3000 Hz:

- Transmit: +0.15 to -0.15 dB, minimum
- Receive: +0.15 to -0.15 dB, minimum

4-Wire impedance either 600 or 900 Ω

- Return loss from 300 to 3000 Hz: $= > 23$ dB

- Transmission only without robbed bit signaling

- Transmission direction shall be selected from either the primary or secondary T1.

VF cards shall be capable of being taken out of service without dropping active customers.

VF cards shall visually indicate on the front panel their active or idle state.

For inventory control purposes all cards shall report via software their serial number and revision level.

Resource Cards

Frame Relay Switch Card.-- Frame relay switch card shall be capable of being remotely or locally configured via the control port and provide frame routing, dynamic bandwidth allocation, congestion control and frame error checking.

Digital Signal Processor (DSP) Cards.-- Digital signal processor (DSP) cards shall be capable of being remotely or locally configured via the control port and meet the following type requirements:

DSP-1 Card.-- The DSP-1 card shall support 26 DS0 channels and provide subrate multiplexing and multidrop data bridging applications.

DSP-2 Card.-- The DSP-2 card shall support 26 DS0 channels and provide subrate multiplexing, multidrop data bridging, PCM bridging, and DDS applications.

DSP-3 Card.-- The DSP-3 card shall support 48 DS0 channels and provide subrate multiplexing, multidrop data bridging, PCM bridging, DDS and High Capacity Voice applications.

DSP-4 Card.-- The DSP-4 card shall support 48 DS0 channels and provide subrate multiplexing, switching, multidrop data bridging, PCM bridging, DDS and High Capacity Voice applications.

Data Communications (DCP) Card.-- Data communications (DCP) card shall be capable of being remotely and locally configured via the control port and meet the following requirements:

- 31 Control packet switching system (CPSS) channels per card capacity
- High speed and high capacity CPSS packet switching
- DDS and ADPCM compatible

Common Control Cards

System Control Card 3.-- The system control card 3 shall be capable of being remotely and locally configurable via the control port and meet the following requirements:

- A. Have integral memory module with the latest software version.
- B. Contain built-in test circuitry which detects a failure or fault condition and supplies a fault indication.
- C. Node system processing, maintenance and timing generation.
- D. Digital cross connect switching (DCS).
- E. Communications from internal memory module using non-volatile memory to resource cards, application cards, channel units and data termination units/panels.
- F. Alarm monitoring and notification.
- G. Display T1/DS1 Multiplexer status.
- H. Two RS 232 serial ports.

General Facilities Card.-- The general facilities card shall be capable of being remotely and locally configurable via the control port and meet the following requirements:

- A. μ -law faceplate as per AT&T specifications.
- B. Alarm port.
- C. Voltage testpoints for T1/DS1 Multiplexer and channel card power supplies.
- D. Network testpoints: 600-Ohm terminating impedance at 0 dB TLPs.
- E. Tone generator as per CCITT G.711 standard.
- F. Timing input for T1 and composite 64 kHz signals.
- G. Order wire configurable as a LGS circuit with either a passive communications link or an audio monitoring channel.

Expander Card.-- The expander module shall provide additional digital cross connect switching matrix resources to the universal channel slot cards by doubling the bandwidth of the cards by up to 64 Mbps.

Universal Channel Slot and Circuit Board Extender Card.-- The universal channel slot and circuit board extender card shall meet the following requirements:

- A. The circuit board extender shall extend a circuit board to permit full access to the circuit for testing and maintenance.
- B. A circuit board placed into the circuit board extender shall be fully functional.
- C. Circuit board extender cards shall be provided to permit "extending" any one circuit board at a time.
- D. Each channel slot of the multiplexer shall meet all performance requirements specified herein while any circuit board extender is installed.

CARD CAGE ASSEMBLY

Card cage assembly shall have capacity for 15-25.4 mm wide cards. Overall dimensions for the card cage assembly shall be 133 mm (H) x 482.6 mm (W) x 254 mm (D) made from an aluminum chassis, and having an unloaded weight of under 2.268 kg. Operating temperature shall have a range of -20°C to 50°C. Card cage assembly shall have a power supply for the modems and TCVRs with line cord with input power range of 115 V(ac) \pm 15 percent, 60 Hz. The interface cable between the asynchronous fiber optic modems and TCVR-CHs in the card cage assembly and the RS-232 distribution panel shall be specified by the RS-232 distribution panel manufacturer and provided and installed by the Contractor.

The contract lump sum price paid for modify Communication Hub assembly shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in modify Communication Hub assembly, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-3.36 TRAFFIC OPERATION SYSTEM ASSEMBLY

The traffic operation system (TOS) cabinet assembly consists of the following:

Qty	Description
7	Asynchronous fiber optic modems
1	DS1 optical modem
3	RS 232 distribution panels
18	RS 232 serial cables
1	T1/DS1 multiplexer
1	Interconnect/termination unit
2	Card cage assembly
1	Contractor-furnished Model 334 cabinet

T1/DS1 Multiplexer consists of the following:

Qty	Description
1	T1 equipment shelf
1	Line interface modules (LIM) T1
2	Aggregate Cards: Dual 1.544 Mbps T1/DS1
3	Data Cards: Direct connect cards
1	Resource Cards: DSP-3 Cards
1	Common Control Cards: System Control Card 3
1	Common Control Cards: General facilities card
1	Common Control Cards: Expander modules

The asynchronous fiber optic modem, DS1 optical modem, RS 232 distribution panel, RS 232 serial cable, T1/DS1 multiplexer, and interconnect/termination unit are described elsewhere in these special provisions.

All equipment listed is rack mounted and described below or elsewhere in these special provisions. Also included in the TOS cabinet assembly will be the installation of the Model 334 cabinet foundation.

The Contractor shall construct each cabinet foundation as shown on Standard Plan ES-4B for Model 334 cabinets (including furnishing and installing anchor bolts) and shall install the cabinet on said foundation. The Contractor shall make all field wiring connections to the cabinet for the power conductors and all related fiber optic connections as shown on the plans.

CONTRACTOR FURNISHED MODEL 334 CABINET

All necessary mounting hardware and wiring, foundation and anchor bolts and other equipment, shall be as shown on the plans and specified in these special provisions

The housing and the mounting cage shall conform to those of the Model 334 cabinet provisions of the "Transportation Electrical Equipment Specifications" (TEES) issued by the State of California, Department of Transportation, and to all addendum thereto current at the time of project advertising. Police panel however, is not required.

Foundations for Model 334-CCTV cabinet housing shall conform to the details on Standard Plan ES-3C for Model 332 and 334 Cabinets.

The power distribution assembly shall consist of the following: one 30 A, 120 V minimum, single pole main breaker; three 15 A, 120 V minimum, single pole secondary breakers; eight standard 120 V(ac) receptacles; and one duplex, 3 prong, NEMA Type 5-15R grounded utility type outlet. The power distribution assembly shall protect the equipment powered by the assembly from power transients. Over voltage protection shall be provided for the power distribution assembly and shall contain as a minimum, a surge arrestor, which shall reduce the effect of power line voltage transients and be rated as follows:

Recurrent Peak Voltage	184 V
Energy Rating (Minimum)	20 J
Power Dissipation, Average	0.85 W
Peak Current for pulses less than 7 microseconds	1250 A

Stand-by Current for 60 Hz Sinusoidal	1 mA or less
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The thermostatically controlled fan shall provide 4.25 cubic meter per minute of ventilation. The fan shall be activated when the temperature inside the cabinet exceeds 24°C and shut off when the temperature is less than 18°C. All vents shall be filtered.

All cabinet assemblies shall be tested to demonstrate the correct function of all controls in the presence of the Engineer.

Surge Protection.--The Contractor shall furnish and install AC Protection unit in the Model 334-CCTV cabinets with the following specifications:

The unit shall have diagnostic circuitry and diagnostic lamps indicating:

LINE OK

LINE FAULT

PROTECTION PRESENT

Shall meet UL 1449, UL 1283 and UL 497A specifications.

The AC Protector shall be rated as follows:

Maximum Energy Absorption: 720 Joules.

High Voltage Transient Spike Suppression: Up to 36 000 A spikes.

Transient Response Time: instantaneous (0.1 ns.)

Protection Modes: All 3: H-N, H-G, N-G.

High Frequency Noise Suppression: Up to 80 dB from 50 kHz to 1,000 MHz.

Rated Current and Load Handling: 15 Amperes max. (1,800 W), 15 Amperes per socket (1,800 W) Rated Voltage: 120 V(ac), 50/60 Hz.

Circuit Breaker: 15 A.

Receptacles: 6 (NEMA 5-15R).

Cord: 2 m (78.74 inches) with grounded 3-prong plug.

Dimensions: 44.45 mm x 82.55 mm x 228.60 mm.

Weight: 1.36 kg.

Product Warranty: Lifetime.

Dataline Protection

Clamping Voltage: 200 Volts peak \pm 10 percent

Response Time: 5 ns nanoseconds

Energy Rating: 90 Joules

Peak Transient Input Voltage: 6000 Volts, 10 microseconds

Output: RJ 11 modular jack

Payment

The contract lump sum price paid for TOS assembly shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in TOS assembly, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

10-3.37 PAYMENT

The contract lump sum price or prices paid for signal and lighting shall include highway lighting at intersections in connection with signals only.

Other roadway lighting, decorative lighting, temporary lighting, and pedestrian walkway lighting on the project shall be considered as included in the contract lump sum price paid for lighting and sign illumination.

Full compensation for hauling and stockpiling electrical materials shall be considered as included in the contract price paid for the item requiring the material to be salvaged and no additional compensation will be allowed therefor.

If any of the fabrication sites for the materials listed are located more than 480 air line kilometers from both Sacramento and Los Angeles, additional shop inspection expenses will be sustained by the State. Whereas it is and will be impractical and difficult to determine the actual increase in these expenses, it is agreed that payment to the Contractor for furnishing these listed materials from each fabrication site located more than 480 air line kilometers from both Sacramento and Los Angeles will be reduced \$2000:

1. Changeable message signs
2. Service equipment enclosures
3. Closed circuit television cabinets furnished by the Contractor

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The contract lump sum price paid for Changeable Message Sign shall include full compensation for furnishing all the materials, tools, and incidentals and for doing all the work to install Changeable Message Sign complete in place, as shown on the plans, specified in the specifications and as directed by the Engineer.

The Changeable Message Sign shall be State furnished materials, per the Specifications.

Full compensation for removing roadway lighting shall be considered as included in the contract lump sum price paid for lighting and sign illumination and no additional compensation will be allowed therefor.

Full compensation for service equipment enclosure including service pad (concrete foundation), and monthly electric bill for all temporary or stage electrical shall be considered as included in the contract lump sum price paid for lighting and sign illumination and no additional compensation will be allowed therefor.

Full compensation for furnishing, installing, and maintaining temporary lighting systems, including all luminaires, poles, wiring, conduits, pull boxes, service connections, and power generators shall be considered as included in the contract lump sum price paid for lighting and sign illumination and no additional compensation will be allowed therefor.

The contract price paid per meter for fiber optic conduit of the various sizes, types and installation methods involved shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing the conduit, including conduit expansion fittings, shoring, steel sleeve, and couplers as shown on the plans,

including all the backfill material required and for sealing plugs, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract price paid per meter for communication conduit of various sizes, types, and installation methods involved shall include innerduct and full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in installing the conduit, including conduit expansion fittings, shoring, and couplers as shown on the plans, including all the backfill material required and for sealing plugs, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract price paid per meter for innerduct shall be included in the per meter price paid for Communication Conduit, which shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals for doing all the work involved in innerduct, complete in place, including pull tape, sealing plugs and innerduct coupling, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer and no additional compensation will be allowed therefore.

The contract unit price paid for splice vault shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved necessary for installation of splice vault, complete in place, as shown on the plans, as specified in these special provisions, and as directed by the Engineer.

Full compensation for pull boxes of the various types and sizes shown on the plans shall be considered as included in the contract prices paid for various items of work requiring pull boxes and no additional compensation will be allowed therefor.

The contract price paid per meter for fiber optic cable of the types listed in the Engineer's Estimate, shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in the fiber optic cable of the type involved, including fiber optic labeling, splice closures, splice trays and splicing complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

The contract lump sum price paid for install, maintain, and remove temporary fiber optic system shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, including associated conduits, conductors, fiber optic cables, pull boxes, and for doing all the work involved in installing the temporary fiber optic system, maintaining the system complete in place during construction, and removal of the temporary fiber optic system as shown on the plans submitted to the Engineer by the Contractor, and specified in these special provisions, and as directed by the Engineer.

SECTION 10-4. FIBER OPTIC COMMUNICATION CABLE PLANT

10-4.01 COMMUNICATION SYSTEM

FIBER OPTICS GLOSSARY

Breakout.--The cable "breakout" is produced by (1) removing the jacket just beyond the last tie-wrap point, (2) exposing one to 2 m of the cable buffers, aramid strength yarn and central fiberglass strength member, and (3) cutting the aramid yarn, central strength member and the buffer tubes to expose the individual glass fibers for splicing or connection to the appropriate device.

Connector.--A mechanical device used to provide a means for attaching to and decoupling from a transmitter, receiver, or another fiber (such as on a patch panel).

Connectorized.--The termination point of a fiber after connectors have been affixed.

Connector Module Housing (CMH).--A patch panel used to terminate singlemode or multimode fibers with most common connector types. It may include a jumper storage shelf and a hinged door.

Couplers.--Couplers are devices which mate two fiber optic connectors to facilitate the transition of optical light signals from one connector into another. They are normally located within FDFs and ITUs mounted in panels. They may also be used unmounted, to join two simplex fiber runs.

Fiber Distribution Frame (FDF).--A rack mounted system that is usually installed in the TMC and the HUB location, that consists of a standard equipment rack, fiber routing guides, horizontal jumper troughs, fiber distribution units (FDU), connector module housings (CMH), and splice module housings (SMH).

Fiber Distribution Unit (FDU).--An enclosure or rack mountable unit containing both a Connector Module Housing (CMH) and a Splice Module Housing enclosure. The units CMH and SMH may be integrated by a partition.

F/O.--Fiber optic.

FOIP.--Fiber optic inside plant cable.

FOP.--Fiber optic outside plant cable.

FOTP.--Fiber optic test procedure(s) as defined by EIA/TIA standards.

Interconnect/Termination Unit (ITU).--A patch panel used to terminate fibers with most common connector types. It may include a jumper storage shelf and a hinge door.

Jumper.--A short cable, typically 1 m or less, used to join two connector module housing (CMH) couplers or a CMH to active electronic components.

Light Source.--Portable fiber optic test equipment that, when coupled with a power meter, is used to perform end-to-end attenuation testing. It contains a stabilized light source operating at the designed wavelength of the system under test.

Link.--A passive section of the system, the ends of which are connectorized. A link may include splices and couplers. For example, a video link may be from a F/O transmitter to a video multiplexer (MUX).

Link Loss Budget.--A calculation of the overall permissible attenuation from the fiber optic transmitter (source) to the fiber optic receiver (detector).

Loose Tube Cable.--Type of cable construction in which fibers are placed in filled buffer tubes to isolate them from outside forces (stress). A flooding compound or material is applied to

the interstitial cable core to prevent water migration and penetration. This type of cable is primarily for outdoor applications.

Mid-Span Access Method.--A procedure in which fibers from a single buffer tube are accessed and spliced to an adjoining cable without cutting the unused fibers in the buffer tube or disturbing the remaining buffer tubes in the cable.

Optical Time Domain Reflectometer (OTDR).--Fiber optic test equipment (similar in appearance to an oscilloscope) that is used to measure the total amount of power in a fiber optic cable between two points. It provides a visual and printed display of the losses associated with system components such as fiber, splices and connectors.

Patchcord.--A term used interchangeable with "jumper".

Patch Panel.--A precision drilled metal frame containing couplers used to make two fiber optic connectors.

Pigtail.--Relatively short length of fiber optic cable that is connectorized on only one end.

Power Meter.--Portable fiber optic test equipment that, when coupled with a light source, is used to perform end-to-end attenuation testing. It contains a detector that is sensitive to light at the designed wavelength of the system under test. Its display indicates the amount of optical power received at the end of the link.

Riser Cable.--NEC approved cable installed in a riser (a vertical shaft in a building connecting one floor to another).

Segment.--A section of F/O cable that is not connected to any active device and may or may not have splices per the design.

Splice.--The permanent joining of two fiber ends using a fusion splicer.

Splice Closure.--An environmentally sealed container used to organize and protect splice trays. The container allows splitting or routing of fiber cables from multiple locations. Normally installed in a splice vault.

Splice Module Housing (SMH).--A unit that stores splice trays as well as pigtails and short cable lengths. The unit allows splitting or routing of fiber cables to or from multiple locations.

Splice Tray.--A container used to organize and protect spliced fibers.

Splice Vault.--A container used to organize and protect spliced fibers.

Tight Buffered, Non-Breakout Cable (Tight Buffer Cable).--Type of cable construction where each glass fiber is tightly buffered (directly coated) with a protective thermoplastic coating to 900 μm (compared to 250 μm for loose tube fibers).

FIBER OPTIC OUTSIDE PLANT CABLE

GENERAL

Each fiber optic outside plant cable (FOP) for this project shall be all dielectric, gel filled, duct type, with loose buffer tubes and shall conform to these special provisions. Cables with singlemode fibers shall contain singlemode (SM) dual-window (1310 nm and 1550 nm) fibers.

The optical fibers shall be contained within loose buffer tubes. The loose buffer tubes shall be stranded around an all dielectric central member. Aramid yarn and/or fiberglass shall be used as a primary strength member, and a polyethylene outside jacket shall provide for overall protection.

All fiber optic (F/O) cable on this project shall be from the same manufacturer, who is regularly engaged in the production of this material.

The cable shall be qualified as compliant with Chapter XVII, Title 7, Part 1755-900 of the Code of Federal Regulations, "REA specification for filled fiber optic cables" (which replaced

the United States Department of Agriculture Rural Electrification Administration specifications REA-PE-90).

The following is the fiber count for each type of fiber optic cable:

Type B fiber optic cable shall contain 60 singlemode fibers.

Type C fiber optic cable shall contain 48 singlemode fibers.

Type D fiber optic cable shall contain 12 singlemode fibers.

Type E fiber optic cable shall contain 144 singlemode fibers.

FIBER CHARACTERISTICS

Each optical fiber shall be glass and consist of a doped silica core surrounded by concentric silica cladding. All fibers in the buffer tube shall be usable fibers, and shall be sufficiently free of surface imperfections and inclusions to meet the optical, mechanical, and environmental requirements of these specifications. The required fiber grade SM shall reflect the maximum individual fiber attenuation, to guarantee the required performance of each and every fiber in the cable.

The coating shall be a dual layered, UV cured acrylate. The coating shall be mechanically or chemically strippable without damaging the fiber.

The cable shall comply with the optical and mechanical requirements over an operating temperature range of -40°C to +70°C. The cable shall be tested in accordance with EIA-455-3A (FOTP-3), "Procedure to Measure Temperature Cycling Effects on Optical Fiber, Optical Cable, and Other Passive Fiber Optic Components." The change in attenuation at extreme operational temperatures (-40°C to +70°C) for singlemode fiber shall not be greater than 0.20 dB/km, with 80 percent of the measured values no greater than 0.10 dB/km. The singlemode fiber measurement is made at 1550 nm.

For all fibers the attenuation specification shall be a maximum attenuation for each fiber over the entire operating temperature range of the cable.

Singlemode fibers within the finished cable shall meet the requirements in the following table:

Fiber Characteristics Table

Parameters	SM
Type	Step Index
Core diameter	8.3 μm (nominal)
Cladding diameter	125 $\mu\text{m} \pm 1.0 \mu\text{m}$
Core to Cladding Offset	$\leq 0.8 \mu\text{m}$
Coating Diameter	250 $\mu\text{m} \pm 15 \mu\text{m}$
Cladding Non-circularity defined as: [1-(min. cladding dia \div max. cladding dia.)]x100	$\leq 1.0\%$
Proof/Tensile Test	345 MPa, min.
Attenuation: @1310 nm @1550 nm	$\leq 0.4 \text{ dB/km}$ $\leq 0.4 \text{ dB/km}$
Attenuation at the Water Peak	$\leq 2.1 \text{ dB/km @ } 1383 \pm 3\text{nm}$
Bandwidth at 1310 nm	N/A
Chromatic Dispersion: Zero Dispersion Wavelength	1301.5 to 1321.5 nm
Zero Dispersion Slope	$\leq 0.092 \text{ ps}/(\text{nm}^2 \cdot \text{km})$
Maximum Dispersion:	$\leq 3.3 \text{ ps}/(\text{nm} \cdot \text{km})$ for 1285 - 1330 nm $< 18 \text{ ps}/(\text{nm} \cdot \text{km})$ for 1550 nm
Cut-Off Wavelength	$< 1250 \text{ nm}$
Numerical Aperture (measured in accordance with EIA-455-47 (FOTP-47))	N/A
Mode Field Diameter (Petermann II)	9.3 $\pm 0.5 \mu\text{m}$ at 1300 nm 10.5 $\pm 1.0 \mu\text{m}$ at 1550 nm

COLOR CODING

Optical fibers shall be distinguishable from others in the same buffer tube by means of color coding according to the following:

- | | |
|----------------|-----------------|
| 1. Blue (BL) | 7. Red (RD) |
| 2. Orange (OR) | 8. Black (BK) |
| 3. Green (GR) | 9. Yellow (YL) |
| 4. Brown (BR) | 10. Violet (VL) |
| 5. Slate (SL) | 11. Rose (RS) |
| 6. White (WT) | 12. Aqua (AQ) |

Buffer tubes containing fibers shall also be color coded with distinct and recognizable colors according to the same table listed above for fibers.

The colors shall be targeted in accordance with the Munsell color shades and shall meet EIA/TIA-598 "Color Coding of Fiber Optic Cables."

The color formulation shall be compatible with the fiber coating and the buffer tube filling compound, and be heat stable. It shall not fade or smear or be susceptible to migration and it shall not affect the transmission characteristics of the optical fibers and shall not cause fibers to stick together.

CABLE CONSTRUCTION

General.--The fiber optic cable shall consist of, but not be limited to, the following components:

- A. Buffer tubes
- B. Central member
- C. Filler rods
- D. Stranding
- E. Core and cable flooding
- F. Tensile strength member
- G. Ripcord
- H. Outer jacket

Buffer tubes.--Loose buffer tubes shall provide clearance between the fibers and the inside of the tube to allow for expansion without constraining the fiber. The fibers shall be loose or suspended within the tubes and shall not adhere to the inside of the tube. Each buffer tube shall contain a maximum of 12 fibers.

The loose buffer tubes shall be extruded from a material having a coefficient of friction sufficiently low to allow free movement of the fibers. The material shall be tough and abrasion resistant to provide mechanical and environmental protection of the fibers, yet designed to permit safe intentional "scoring" and breakout, without damaging or degrading the internal fibers.

Buffer tube filling compound shall be a homogenous hydrocarbon-based gel with anti-oxidant additives and used to prevent water intrusion and migration. The filling compound shall be non-toxic and dermatologically safe to exposed skin. It shall be chemically and mechanically compatible with all cable components, non-nutritive to fungus, non-hygroscopic and electrically non-conductive. The filling compound shall be free from dirt and foreign matter and shall be readily removable with conventional nontoxic solvents. An absorbent polymer, which fills voids and swells to block the ingress of water can be used instead of the gel fill.

Buffer tubes shall be stranded around a central member by a method that will prevent stress on the fibers when the cable jacket is placed under strain, such as the reverse oscillation stranding process.

Each buffer tube shall be distinguishable from other buffer tubes in the cable by means of color coding as specified for fibers.

Central Member.--The central member, which functions as an anti-buckling element, shall be a glass reinforced plastic rod with similar expansion and contraction characteristics as the optical fibers and buffer tubes. To provide the proper spacing between buffer tubes during stranding a linear overcoat of polyethylene may be applied to the central member to achieve the optimum diameter.

Filler rods.--Fillers may be included in the cable to lend symmetry to the cable cross-section where needed. Filler rods shall be solid medium or high density polyethylene. The diameter of filler rods shall be the same as the outer diameter of the buffer tubes.

Stranding.--Completed buffer tubes shall be stranded around the overcoated central member using stranding methods, lay lengths and positioning such that the cable shall meet mechanical,

environmental and performance specifications. A polyester binding shall be applied over the stranded buffer tubes to hold them in place. Binders shall be applied with sufficient tension to secure the buffer tubes to the central member without crushing the buffer tubes. The binders shall be non-hygroscopic, non-wicking (or rendered so by the flooding compound), and dielectric with low shrinkage.

Core and Cable Flooding.--The cable core interstices shall contain a water blocking material to prevent water ingress and migration, the water blocking material shall be either a polyolefin based compound or an absorbent polymer, which fills voids and swells to block the ingress of water. The flooding compound shall be homogeneous, non-hygroscopic, electrically non-conductive, and non-nutritive to fungus. The compound shall also be nontoxic, dermatologically safe and compatible with all other cable components.

Tensile Strength Member.--Tensile strength shall be provided by high tensile strength aramid yarns and/or fiberglass which shall be helically stranded evenly around the cable core and shall not adhere to other cable components.

Ripcord.--The cable shall contain at least one ripcord under the jacket for easy sheath removal.

Outer jacket.--The jacket shall be free of holes, splits, and blisters and shall be medium or high density polyethylene (PE), or medium density cross-linked polyethylene with minimum nominal jacket thickness of $1000 \pm 70 \mu\text{m}$. Jacketing material shall be applied directly over the tensile strength members and flooding compound and shall not adhere to the aramid strength material. The polyethylene shall contain carbon black to provide ultraviolet light protection and shall not promote the growth of fungus.

The jacket or sheath shall be marked with the manufacturer's name, the words "Optical Cable", the number of fibers, "SM", year of manufacture, and sequential measurement markings every meter. The actual length of the cable shall be within $-0/+1$ percent of the length marking. The marking shall be permanently marked in a contrasting color to the cable jacket. The height of the marking shall be approximately 2.5 mm.

GENERAL CABLE PERFORMANCE SPECIFICATIONS

The F/O cable shall withstand water penetration when tested with a one meter static head or equivalent continuous pressure applied at one end of a one meter length of filled cable for one hour. No water shall leak through the open cable end. Testing shall be done in accordance with EIA-455-82 (FOTP-82), "Fluid Penetration Test for Fluid-Blocked Fiber Optic Cable."

A representative sample of cable shall be tested in accordance with EIA-455-81A (FOTP-81), "Compound Flow (Drip) Test for Filled Fiber Optic Cable". No preconditioning period shall be conducted. The cable shall exhibit no flow (drip or leak) at 65°C as defined in the test method.

Crush resistance of the finished F/O cables shall be 220 N/cm applied uniformly over the length of the cable without showing evidence of cracking or splitting when tested in accordance with EIA-455-41 (FOTP-41), "Compressive Loading Resistance of Fiber Optic Cables". The average increase in attenuation for the fibers shall be ≤ 0.10 dB at 1550 nm (singlemode) for a cable subjected to this load. The cable shall not exhibit any measurable increase in attenuation after removal of load. Testing shall be in accordance with EIA-455-41 (FOTP-41), except that the load shall be applied at the rate of 3 mm to 20 mm per minute and maintained for 10 minutes.

The cable shall withstand 25 cycles of mechanical flexing at a rate of 30 ± 1 cycles/minute. The average increase in attenuation for the fibers shall be ≤ 0.20 dB at 1550 nm (singlemode) at the completion of the test. Outer cable jacket cracking or splitting observed under 10x

magnification shall constitute failure. The test shall be conducted in accordance with EIA-455-104 (FOTP-104), "Fiber Optic Cable Cyclic Flexing Test," with the sheaf diameter a maximum of 25 times the outside diameter of the cable. The cable shall be tested in accordance with Test Conditions I and II of (FOTP-104).

Impact testing shall be conducted in accordance with EIA-455-25 (FOTP-25) "Impact Testing of Fiber Optic Cables and Cable Assemblies." The cable shall withstand 20 impact cycles. The average increase in attenuation for the fibers shall be ≤ 0.20 dB at 1550 nm (singlemode). The cable jacket shall not exhibit evidence of cracking or splitting.

The finished cable shall withstand a tensile load of 2700 N without exhibiting an average increase in attenuation of greater than 0.20 dB (singlemode). The test shall be conducted in accordance with EIA-455-33 (FOTP-33), "Fiber Optic Cable Tensile Loading and Bending Test." The load shall be applied for one-half hour in Test Condition II of the EIA-455-33 (FOTP-33) procedure.

PACKAGING AND SHIPPING REQUIREMENTS

Documentation of compliance to the required specifications shall be provided to the Engineer prior to ordering the material. The cable manufacturer shall be 1S09001 registered.

Attention is directed to "Fiber Optic Testing," elsewhere in these special provisions.

The completed cable shall be packaged for shipment on reels. The cable shall be wrapped in a weather and temperature resistant covering. Both ends of the cable shall be sealed to prevent the ingress of moisture.

Each end of the cable shall be securely fastened to the reel to prevent the cable from coming loose during transit. Four meters of cable length on each end of the cable shall be accessible for testing.

Each cable reel shall have a durable weatherproof label or tag showing the manufacturer's name, the cable type, the actual length of cable on the reel, the Contractor's name, the contract number, and the reel number. A shipping record shall also be included in a weatherproof envelope showing the above information and also include the date of manufacture, cable characteristics (size, attenuation, bandwidth, etc.), factory test results, cable identification number and any other pertinent information.

The minimum hub diameter of the reel shall be at least thirty times the diameter of the cable. The F/O cable shall be in one continuous length per reel with no factory splices in the fiber. Each reel shall be marked to indicate the direction the reel should be rolled to prevent loosening of the cable.

Installation procedures and technical support information shall be furnished at the time of delivery.

FIBER OPTIC LABELING

Abbreviation:

HUB	HUB.X
VAULT	VXX.X
CAMERA	CXX.X
TOS	TXX.X
PULLBOX	FXX.X

VDS	IXX.X
RAMP METER	RXX.X

The X's denote the kilopost of the above elements.

Pigtails:

Cable Type	From	To	Fiber No.
X	-XXX.X	-XXX.X	-XX

A label shall be placed on each pigtail near the connector showing the point of origin of the link and the termination of the link. A label with the fiber number being spliced shall be placed on the end of the pigtail near the splice.

Example labeling: C-HUB.A-C44.5-10.

Splice Vaults:

Cable Type	From	To
X	-XXX.X	-XXX.X

A label shall be placed on Type A, B, C, and D cables as they enter and exit each splice vault. A label shall be placed on the cable inside the closed circuit television, traffic signal controller, and ramp meter controller.

Example labeling: C-HUB.A-HUB.C

Example labeling: D-C044.5-V044.8

Jumpers:

Equipment From	Equipment To
ID No. by	ID No. by

Both ends shall be labeled near the connector. The label shall be the same on both ends and denote where the ends of the jumper are plugged into.

Splice Trays:

A label shall be placed on each splice tray explaining the splices in the tray.

CABLE INSTALLATION

Installation procedures shall be in conformance with the procedures specified by the cable manufacturer for the specific cable being installed. The Contractor shall submit the

manufacturer's recommended procedures for pulling fiber optic cable at least 20 working days prior to installing cable. Mechanical aids may be used, provided that a tension measuring device, and a breakaway swivel are placed in tension to the end of the cable, and the allowable tension does not exceed the manufacturers recommended pulling tension.

During cable installation, the bend radius shall be maintained at a minimum of twenty times the outside diameter of the cable. The cable grips for installing the fiber optic cable shall have a ball bearing swivel to prevent the cable from twisting during installation.

F/O cable shall be installed, using a cable pulling lubricant recommended by the F/O cable and/or innerduct manufacturer and a non-abrasive pull tape conforming to the provisions described under "Conduit, elsewhere in these special provisions. Contractor's personnel shall be stationed at each splice vault through which the cable is to be pulled to lubricate and prevent kinking or other damage. Splicing of Type E cable shall not be allowed, except for at the project limits. Splicing of Type C cable shall be limited to the splice vault as shown on the Plans. Cable splices shall be located in a splice vault as shown on the plans.

Splicing of Type C cable to Type C cable shall be limited to the splice vault as shown on the Plans. Splicing of Type D cables to Type C cable shall involve only those fibers being spliced as shown on the plans. Splicing of Type C cable within TOS cabinets shall involve only those fibers being spliced as shown on the plans. Cable splices shall be located in splice vaults shown on the plans; the Contractor shall provide the Engineer a schedule, showing the location where splice vaults will be used for Type C cable to Type C cable splicing. A minimum of 36 m of slack shall be provided at each splice vault. Slack shall be divided equally on each side of the F/O splice closure.

The mid-span access method shall be used to access the individual fibers in the distribution cable for splicing to the accessory cable. Cable manufactures recommended procedures and approved tools shall be used when performing a mid-span access. All measures shall be taken to avoid damaging buffer tubes and individual fibers not being used in the mid-span access. The Contractor will be allowed to splice a total of 5 fibers to repair any damage done during mid-span access splicing without penalty. For each additional splice the Contractor will be assessed \$300.00. Any single fiber may not have more than 3 unplanned splices. If the fiber needs to be spliced more than 3 times, the entire length of F/O cable must be replaced at the Contractor's expense.

Following the installation of the cable in innerduct, all duct entrances in cabinets, pull boxes and vaults shall be sealed as described under "conduit" elsewhere in these special provisions.

Unless shown or provided otherwise, only one F/O cable shall be installed in each innerduct. Pulling a separate F/O cable into a spare duct to replace damaged fiber will not be allowed.

At the Contractor's option, the fiber optic cable may be installed by using the air blown method. If integral innerduct is used, the innerduct splice points or any temporary splices used for installation must withstand a static air pressure of 760 kPa.

The fiber installation equipment shall incorporate a mechanical drive unit or pusher which feeds cable into the pressurized innerduct to provide a sufficient push force on the cable, which is coupled with the drag force created by the high-speed airflow. The unit shall be equipped with controls to regulate the flow rate of compressed air entering the innerduct and any hydraulic or pneumatic pressure applied to the cable. It shall accommodate longitudinally ribbed, or smooth wall innerducts from nominal 15 mm to 50 mm inner diameter. Mid assist or cascading of equipment shall be for the installation of long cable runs. The equipment shall incorporate safety shutoff valves to disable the system in the event of sudden changes in pneumatic or hydraulic pressure.

The equipment shall not require the use of a piston or any other air capturing device to impose a pulling force at the front end of the cable, which also significantly restricts the free

flow of air through the innerduct. It shall incorporate the use of a counting device to determine the speed of the cable during installation and the length of the cable installed.

SPLICING

Field splices shall be done either in splice vaults or cabinets as shown on the plans. All splices in splice vaults shall be done in splice trays, housed in splice closures. All splices in cabinets shall be done in splice trays housed in ITUs. All splices done in communication hubs shall be done in splice trays housed in FDUs.

Unless otherwise allowed, the F/O cable splices shall be the fusion type. The mean splice loss shall not exceed 0.07 dB per splice. The mean splice loss shall be obtained by measuring the loss through the splice in both directions and then averaging the resultant values.

When splicing selected fiber of two cables, a "mid-span access" method shall be used. The individual fibers shall be looped one full turn within the splice tray to avoid micro bending. A 45 mm minimum bend radius shall be maintained during installation and after final assembly in the optical fiber splice tray. Each bare fiber shall be individually restrained in a splice tray. The optical fibers in buffer tubes and the placement of the bare optical fibers in the splice tray shall be such that there is no discernible tensile force on the optical fiber.

All splices shall be protected with a metal reinforced thermal shrink sleeve.

SPLICE CLOSURES AND SPLICE TRAYS

The F/O field splices shall be enclosed in splice closures which shall be complete with splice organizer trays, brackets, plugs, clips, cable ties, seals and sealants, as needed. The splice closure shall be suitable for a direct burial or pull box application. The manufacturer's installation instructions shall be supplied to the Engineer prior to the installation of any splice closures. Location of the splice closures shall be where a splice is required as shown on the plans, designated by the Engineer, or described in these special provisions.

The splice closure shall conform to the following:

- non filled thermoplastic case
- pressurizable, rodent proof, water proof, re-enterable and moisture proof
- expandable from 2 cables per end to 8 cables per end by using adapter plates
- cable entry ports shall accommodate 10 mm to 25 mm diameter cables
- multiple grounding straps
- accommodate up to 8 splice trays
- suitable for "butt" or "through" cable entry configurations
- place no stress on finished splices within the splice trays

Splice closures shall be attached by bolted suitable hangers to the side wall of the splice vault.

Splice trays in the splice closures shall conform to the following:

- accommodate up to 24 fusion splices, for singlemode systems
- place no stress on completed splices within the tray
- accommodate "butt" or "through" splicing applications
- accommodate up to 8 buffer tubes, holding up to 48 fibers
- stackable with a snap-on hinge cover
- buffer tubes securable with channel straps
- contain fiber retention strips that accommodates either fusion or mechanical splices

- must be labeled per these special provisions

FIBER OPTIC SPLICE VAULT

Fiber optic splice vaults shall conform to the Western Underground Committee Guide No. 3.6 "Nonconcrete Enclosures," except where differences are noted here, and the details on the plans. Fiber optic splice vaults shall have minimum inside clearance of 914 mm (W) x 1520 mm (L) x 1520 mm (D).

Covers shall be 2 piece torsion assisted sections. Cover marking shall be "CALTRANS FIBER OPTICS" on each cover section. Each cover section shall have inset lifting pull slots. Cover hold down bolts or cap screws and nuts shall be of brass, stainless steel, or other non-corroding metal material. Covers shall be hot dipped galvanized steel.

Fiber optic splice vaults and covers shall be rated for AASHTO HS 20-44 loads and installed as detailed and where shown on the plans. A concrete encasement ring shall be poured around the splice vault as shown on the plans. Concrete placed around and under traffic splice vaults as shown on the plans shall contain a minimum of 325 kg of portland cement per cubic meter.

Hangers shall be made of a non-corroding material and be free of any sharp edges. A separate hanger shall be provided for each type of fiber optic cable and be securely fastened to the side wall with the slack fiber optic cable neatly coiled in a figure-eight configuration.

A minimum of two "U shaped" knockouts are required on each side of the vault and shall be configured to allow for future removal of the vault without disturbing the existing conduits.

PASSIVE CABLE ASSEMBLIES AND COMPONENTS

The F/O cable assemblies and components shall be compatible components, designed for the purpose intended, and manufactured by a company regularly engaged in the production of material for the fiber optic industry. All components or assemblies shall be best quality, non-corroding, with a design life of at least 20 years.

FIBER OPTIC CABLE TERMINATIONS

Distribution Breakout

The jacketed cable shall be lashed with tie wraps to the rack prior to entering the **FDU or ITU**. The cable shall also be tie-wrapped to the inside of the **FDU or ITU** near the point of entry. The glass fibers shall not be damaged during cutting and removal of the buffer tubes.

The jacketed area and bare fibers shall be cleaned to remove the moisture blocking gel. The transition from the buffer tube to the bundle of jacketed fibers shall be treated by an accepted procedure for sleeve tubing, shrink tube and silicone blocking of the transition to prevent future gel leak. A subsequent transition shall then be made, with flexible tubing, to isolate the fiber bundles of each buffer tube to serve as a transition from the bundle to the separation point and to protect the individual coated fibers. The last transition point (bundle to single fiber) shall consist of inserting the individual fibers into 26 AWG clear teflon tubing, to protect the fiber as it is routed toward the splice tray and to allow clear color identification of fibers for proper distribution. The final transition from bundle to individual fiber tube shall be secured with an adhesive heat shrink sleeve.

All fibers terminating in a cabinet or rack shall be properly terminated inside a FDU or ITU.

Distribution Interconnect Package

General--Distribution involves connecting the fibers to the active electronic components. The distribution equipment consists of FDUs or ITUs with connector panels, couplers, splice trays, fiber optic pigtails and cable assemblies with connectors. The distribution interconnect package shall be assembled and tested by a company who is regularly engaged in the assembly of these packages. Attention is directed to "Fiber Optic Testing" elsewhere in these special provisions. All distribution components shall be products of the same manufacturers, who are regularly engaged in the production of these components, and the respective manufacturers shall have quality assurance programs.

Fiber Optic Cable Assemblies and Pigtails

General.--Cable assemblies (jumpers) and pigtails shall be products of the same manufacturer. The cable used for cable assemblies (jumpers) and pigtails shall be made of fiber meeting the performance requirements of these special provisions for the F/O cable being connected.

Pigtails.--Pigtails shall be of simplex (one fiber) or duplex (two fibers) construction, in 900 μ m tight buffer form, surrounded by aramid for strength, with a PVC jacket with manufacturer identification information. Singlemode cable jackets shall be yellow in color. Duplex pigtails shall be of duplex round cable construction, and shall not have zipcord (siamese) construction. The two inner simplex jackets shall be color coded white and slate, respectively, to provide easy visual identification for polarity. All pigtails shall be at least one meter in length.

Jumpers.--Jumpers may be of simplex or duplex design. Duplex jumpers shall be of duplex round cable construction, and shall not have zipcord (siamese) construction. All jumpers shall be at least 2 m in length, sufficient to avoid stress and orderly routing. The outer jacket of duplex jumpers shall be colored yellow. The two inner simplex jackets shall be color coded white and slate, respectively, to provide easy visual identification for polarity.

SC Connectors.- SC type connectors shall meet the requirements of EIA/TIA-568A except as specified below. SC connector body housings shall be of polymer construction.

All F/O connectors shall have a 2.5 mm diameter, Zirconia Ceramic, SC connector ferrule with a PC (Physical Contact) pre-radius tip.

The SC connector operating temperature range shall be -40°C to +70°C. Insertion loss shall not exceed 0.4 dB for singlemode and the return reflection loss on connectors shall be at least 50 dB. Connection durability shall be less than a 0.2 dB change per 500 mating cycles per EIA-455-21A (FOTP-21). All terminations shall provide a minimum 222N pullout strength. Factory test results shall be documented and submitted to the Engineer prior to installing any of the connectors. Singlemode connectors shall have a blue color on the shroud and a white color on the boot in accordance with the Munsell color shades specified elsewhere, that renders them easily identifiable.

Field terminations shall be limited to splicing of adjoining cable ends and/or cables to SC pigtails.

ST Connectors.-- ST type connectors shall meet the requirements of EIA/TIA-568A except as specified below. ST connector body housings shall be of polymer construction.

All F/O connectors shall have a 2.5 mm diameter, Zirconia Ceramic, ST connector ferrule with a PC (Physical Contact) pre-radius tip.

The ST connector operating temperature range shall be -40°C to +70°C. Insertion loss shall not exceed 0.5 dB, for either multimode or singlemode, and the return reflection loss on singlemode connectors shall be at least 40 dB. Connection durability shall be less than a 0.2 dB change per 500 mating cycles per EIA-455-21A (FOTP-21). All terminations shall provide a minimum 222 N pullout strength. Factory test results shall be documented and submitted to the Engineer prior to installing any of the connectors. Singlemode connectors shall have a blue color on the shroud and a white color on the boot in accordance with the Munsell color shades specified elsewhere, that renders them easily identifiable.

Field terminations shall be limited to splicing of adjoining cable ends and/or cables to ST pigtails.

SC Couplers. — The SC couplers shall be made of polymer construction that is consistent with the material forming the associated SC connector body. The design mechanism for mounting the couplers to the ITU connector panel may be achievable using metal clips or fasteners but shall coincide with the ITU panel punch-outs.

All coupler sleeves shall be of the cylinder split ceramic or clover leaf design.

The temperature operating range for couplers shall be the same as that specified for the SC connectors.

ST Couplers. — The ST couplers shall be made of polymer construction that is consistent with the material forming the associated ST connector body. The design mechanism for mounting the couplers to the ITU connector panel may be achievable using metal clips or fasteners but shall coincide with the ITU panel punch-outs.

All coupler sleeves shall be of the cylinder split ceramic or clover leaf design.

The temperature operating range for couplers shall be the same as that specified for the ST connectors.

Splice Trays.— Splice trays must accommodate a minimum of 12 fusion splices. They must allow for a minimum bend radius of 45 mm. No stress can be placed on the fiber when it is located in its final position. Buffer tubes must be secured to the tray near the entrance of the splice tray to reduce the chance that an inadvertent tug on the pigtail will damage the fiber. Reduced length splice trays will only be allowed in wall mounted type fiber termination units. The splice tray cover must be transparent.

Only one single splice tray may be secured by a bolt through the center of the tray in the ITU. Multiple trays must be securely held in place by a different method.

Interconnect and Termination Unit

The Contractor shall furnish and install all related equipment to interface the rack mount interconnect and termination unit (ITU) to the incoming fiber optic communications cable and the patchcord fiber optic cable.

The ITU shall be a modular enclosure that provides interconnect capability of one multi-fiber cable to a minimum of 12 single-fiber cable. The ITU shall be environmentally sealed and contain grommets at the cable entrances to prevent any ingress of dirt or moisture. Strain relief shall be provided for the fiber optic cable. The ITU shall contain a splice tray, connector panel and the appropriate number of pigtails which will be fusion spliced to the incoming fiber cable. Each fiber shall be fusion spliced to a pigtail with a factory installed and polished SC connector. Each pigtail shall be labeled and secured onto cable as described elsewhere in these special provisions. Brackets shall be provided to spool the incoming fiber optic cable to minimum of 3 turns before separating out individual fibers to the connector panel.

Interconnect and termination unit (ITU) shall be packaged in a rack unit with dimensions of 432 mm (W) X 44.45 mm (H) X 280 mm (D) having metal housing slide-out shelf. The ITU shall contain grommets at cable entrances and provide strain relief for the fiber cable. The ITU

shall accommodate 12 single mode fibers having SC type connector feed through adapters and 12 interconnection points or 12 splices. The components of the passive interconnect package shall be installed in the ITU.

The ITU shall be a metal enclosure with a hinged door. The door shall have a latch or thumbscrew to hold the door in the closed position. An opening shall be provided on the back side of the incoming fiber optic communications cable. Connector panels (for up to 12 SC connectors) shall be provided inside the enclosure. Strain relief shall be provided for the incoming fiber optic cable. A guard shall be provided to protect the patchcord fiber optic cables plugged into this enclosure.

FIBER OPTIC TESTING

General

Testing shall include the tests on elements of the passive fiber optic components: ~~(1) at the factory, (2) after installation but prior to connection to any other portion of the system, and (3) during final system testing.~~

The Contractor shall provide all personnel, equipment, instrumentation and materials necessary to perform all testing. The Engineer shall be notified two working days prior to all field tests. The notification shall include the exact location or portion of the system to be tested.

Documentation of all test results shall be provided to the Engineer within 2 working days after the test involved.

A minimum of 20 days prior to arrival of the cable at the site, the Contractor shall provide detailed test procedures for all field testing for the Engineer's approval. The procedures shall include the tests involved and how the tests are to be conducted. Included in the test procedures shall be model, manufacturer, configuration, calibration and alignment procedures for all proposed test equipment.

After Cable Installation

After the fiber optic cable has been pulled but before breakout and termination, 100 percent of all the fibers shall be tested with an OTDR for attenuation. Test results shall be recorded, dated, compared and filed with the previous copies of these tests. Copies of traces and test results shall be submitted to the Engineer. If the OTDR test results are unsatisfactory, the F/O cable segment will be unacceptable. The unsatisfactory segment of cable shall be replaced with a new segment, without additional splices, at the Contractor's expense. The new segment of cable shall then be tested to demonstrate acceptability. Copies of the test results shall be submitted to the Engineer.

Attenuation tests shall be performed with an OTDR capable of recording and displaying anomalies of 0.02 dB as a minimum. Singlemode fibers (SM) shall be tested at 1310 nm and 1550 nm. Attenuation readings for each direction shall be recorded on the cable data sheet.

The OTDR shall have a printer capable of producing a verifying test trace with fiber identification as shown in Appendix A "Link Loss Budget Work Sheet", numerical loss values, the date and the operator's name. It shall also have a Window based 89 mm (or 3.5 inch) disk recording capability that has associated software to do comparisons and reproductions on 216 mm x 279 mm paper, via a personal computer.

Test traces shall be given to the Engineer.

Outdoor Splices

At the conclusion of all outdoor splices at one location, and before they are enclosed and sealed, all splices shall be tested with the OTDR, in both directions. Splices in singlemode segments shall be tested at 1310 nm and at 1550 nm. Individual fusion splice losses shall not

exceed 0.10 dB. Measurement results shall be recorded, dated, validated by the OTDR trace printout and filed with the records of the respective cable runs. Copies of traces and test results shall be submitted to the Engineer within seven days after the test. If the OTDR test results are unsatisfactory, the splice shall be unacceptable. The unsatisfactory splice shall be replaced at the Contractor's expense. The new splice shall then be tested to demonstrate acceptability. Copies of the test results shall be submitted to the Engineer.

Distribution Interconnect Package Testing and Documentation

All the components of the passive interconnect package (FDUs, ITUs, pigtails, jumpers, couplers and splice trays) shall comprise a unit from a manufacturer who is regularly engaged in the production of the fiber optic components described.

In developing the distribution interconnect package, each SC, ST or SC-ST hybrid termination (pigtail or jumper) shall be tested for insertion attenuation loss with the use of an optical power meter and source. In addition, all singlemode terminations shall be tested for return reflection loss. These values shall meet the loss requirements specified earlier and shall be recorded on a tag attached to the pigtail or jumper. The quality control sheets from the manufacturer shall be given to the Engineer before the installation of the pigtails and jumpers.

Once assembly is complete, the manufacturer shall visually verify that all tagging, including loss values, is complete. Then as a final quality control measure, the manufacturer shall do an "end to end" optical power meter/light source test from pigtail end to jumper lead end to assure continuity and overall attenuation loss values.

The final test results shall be recorded, along with previous individual component values, on a special form assigned to each FDF. The completed form shall be dated and signed by the Manufacturer's Quality Control supervisor. One copy of this form will be attached in a plastic envelope to the assembled FDF unit. Copies will be provided separately to the Contractor and to the Engineer, and shall be also be maintained on file by the manufacturer or supplier.

ACTIVE COMPONENT TESTING

The transmitters and receivers shall be tested with a power meter and light source, to record the transmitter average power (dBm) and receiver sensitivity (dBm). These values shall be recorded in the Link Loss Budget Worksheet shown in Appendix A.

SYSTEM VERIFICATION AT COMPLETION

OTDR Testing.--Once the passive cabling system has been installed and is ready for activation, 100 percent of the fibers shall be tested with the OTDR for attenuation. Test results shall be recorded, dated, compared and filed with previous copies. Copies of traces and test results shall be submitted to the Engineer. If the OTDR test results are unsatisfactory the fiber shall be replaced at the Contractor's expense. The new fiber shall then be tested to demonstrate acceptability. Copies of the test results shall be submitted to the Engineer.

Installed System Cable Verification Worksheet.--The Cable Verification Worksheet shown in Appendix A shall be completed for each fiber in the fiber optic system, using the data gathered throughout the installation process. The completed worksheets shall be submitted to the Engineer for approval.

The Total System Gain shall be calculated by subtracting the measured Optical Receiver Sensitivity (line 1B on the "The Link Loss Budget Worksheet") from the measured Optical Transmitter Average Power (line 1A), which were obtained using a power meter and source. The resulting difference shall be the maximum allowable loss between the transmitter and the

receiver, within -0% to +10% of the manufacturers specified loss budget for the transmitter/receiver pair. The Total System Gain shall be recorded on line 1C.

Power Meter and Light Source.--At the conclusion of the final OTDR testing, 100 percent of all fibers shall be tested end to end with a power meter and light source, in accordance with EIA Optical Test Procedure 171 and in the same wavelengths specified for the OTDR tests. These tests shall be conducted in both directions. Test results shall be recorded on the Cable Verification Worksheet, compared and proven to be within the design fiber loss budgets, and filed with the other recordings of the same fibers.

Test Failures.--If during any of these system verification tests, the results prove to be unsatisfactory, the F/O cable will not be accepted. The unsatisfactory segments of cable shall be replaced with a new segment of cable at the Contractor's expense. The new segment of cable shall undergo the same testing procedure to determine acceptability. Copies of the test results shall be submitted to the Engineer. The removal and replacement of a segment of cable shall be interpreted as the removal and replacement of a single contiguous length of cable connecting two splices, two connectors, or a splice and a connector. The removal of only the small section containing the failure and therefore introducing new unplanned splices, will not be allowed.

APPENDIX A
Cable Verification Worksheet

Contract No. _____ Contractor: _____

Operator: _____ Date: _____

Link Number: _____ Fiber Number: _____

Test Wavelength (Circle one): 1310 nm 1550 nm

Location of Fiber Ends: End 1: _____ End 2: _____

1. OTDR Test Results:

A. Forward Loss: _____ dB
B. Reverse Loss: _____ dB
C. Average Loss $[(1A + 1B)/2]$: _____ dB

2. Power Meter and Light Source Test Results:

A. Forward Loss: _____ dB
B. Reverse Loss: _____ dB
C. Average Loss $[2A + 2B]/2$: _____ dB

3. Calculated Fiber Loss

A. Length of the link (from OTDR): _____ km
B. Allowed loss per km of fiber: _____ dB/km
C. Total Allowed Loss of fiber $(3A * 3B)$: _____ dB

4. Calculated Splice Loss:

A. Number of Splices in the Link: _____
B. Allowed Link Loss per Splice: 0.10 dB
C. Total Allowed Loss due to Splices $(4A * 4B)$: _____ dB

5. Calculated Link Loss:

A. Allowed Connector Loss (for 2 connectors): 1.0 dB
B. Total Link Loss $(5A + 3C + 4C)$: _____ dB

6. Cable Verification:

A. Compare Power Meter Average Loss to Calculated Link Loss $(2C-5B)$: _____ dB

If the value on line 6A is greater than zero, the link has failed the Test. See Test Failures elsewhere in these special provisions.

To Be Completed By Caltrans:

Resident Engineer's Signature: _____

Cable Link Accepted By: _____

10-4.02 TRAINING FOR FIBER OPTIC OPERATION AND MAINTENANCE

A training course shall be developed by the Contractor and shall be given to the Engineer and designated personnel. The course shall be an approved GTE, Pac Bell or and AT and T fiber course covering the areas needed on this project to operate and maintain the fiber optic system installed on this contract. A training area will be provided by the State at the District Office Building, 464 W. 4th St., San Bernardino, California.

The training course shall provide training for technical personnel, and shall follow a training outline prepared by the Contractor. The Contractor shall provide all materials and instructors for the course. The course shall be not less than 4 eight-hour (excluding lunch and breaks) days in duration. No more than twenty-five State employees with technical backgrounds will attend this course. Each person shall receive a training manual. The training manual shall be written especially for the freeway CCTV and communications system and shall provide complete procedures for operating, maintaining, and troubleshooting the cable plant, CCTV system assembly, communication hub assembly, TOS cabinet assembly, VDS cabinet assembly and 170 controller interface. The maintenance section of the training course shall cover preventive, routine and emergency maintenance procedures. The emergency maintenance discussion shall provide recommendations for the provisioning and use of emergency repair kits to assist maintenance crews. Ten copies of the project manual shall be given to the Engineer.

The four day training course shall consist of, a total of, 20 hours of class work and 12 hours of hands-on lab work.

Classroom shall consist of the following:

Introduction of Fiber Optics	Fiber Optics Installations
Applications	Optical Testing
Fiber Optic Theory	Fiber Optics Maintenance
Optical Fiber	Fiber Optics Restoration
Connectors	Fiber Optic Safety
Patch Panels	Advance Technologies Review
Splices/Splicing	Light Sources
Detectors	Repeaters
Physical Plant Systems Design	Design Examples

Classroom Lab shall consist of the following (Hands-On):

Acceptance testing	Optical Testing
Cable Preparation	Patch Panel Preparation
Connectorization	OTDR Testing
Splicing	Test Documentation

The Lab groups or stations shall consist of no more then three people per station.

The course shall also include field training using operational equipment at the communication hub, camera locations, CMS and VDS locations. The field training shall include operational checkout of camera site and shall discuss the location of access to the various system field elements. The field training shall also cover how the different systems were installed, problems with the installation and trouble shooting and maintenance tips for the different systems.

The field training shall be in groups of no larger then five but maybe done in more then one day by choice of the Contractor.

The training course shall be designed to assist Maintenance and other personnel in trouble shooting and understanding not only the system that was installed for this project but also existing and future projects.

A maintenance course shall also be provided following the four day course for no more than twenty-five State employees. The maintenance course shall follow a manual written so that Maintenance personnel shall be able to use the manual in trouble shooting, installing, preventive maintenance and designing future fiber optic systems. Each student shall be given a manual to keep at the beginning of the class. A draft copy of the manual shall be given to the Engineer 90 days after the job has started and an updated copy 90 days before the class is to be held for approval. Nine copies, of the approved version by the Engineer, shall be provided to the Engineer for project records (four copies for design, three copies for construction, and two copies for operations).

The Contractor shall provide an evaluation sheet to be completed by the attendees of the courses. The evaluation sheets will be turned in to the Engineer and a copy will be provided to the Contractor. The evaluation sheets need not be signed by the attendees.

The Engineer will notify the Contractor of the number of State personnel who will attend, up to twenty-five for the two courses. The courses must be completed prior to the acceptance of the contract.

PAYMENT

The contract lump sum price paid for training for fiber optic operation and maintenance shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in training for fiber optic operation and maintenance, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

SECTION 10-6. COMMUNICATION EQUIPMENT

10-6.01 GLOSSARY

APD	Avalanche Photodetector.
ADPCM	Adaptive Differential Pulse Code Modulation.
ALBO	Automatic Line Buildout. ALBO provides automatic cable equalization in T1 span-line interface equipment.
AMI	Alternate Mark Inversion.
AT&T	American Telephone and Telegraph Company.
B7	Binary 7.
B8ZS	Binary 8 Zero Substitution. A technique that modifies the alternate mark inversion encoding to ensure pulse density without altering the customer.
BER	Bit error rate.
BERTS	Bit error rate test set.
bps	bits per second.
CCITT	Consultative Committee on International Telegraphy and Telephony.
CGA	Carrier Group Alarm. A service alarm showing out-of-frame (OOF) conditions in the multiplexer.
CRC	Cyclic Redundancy Check.
D-4	A T1 framing format for channel bank operation.
DACS	Digital Access Cross connect System.
DDS	Digital Data System. DDS is a private line digital service provided by the Public Telephone Network. It supports data rates at 2400, 4800, 9600 and 56 000 bits per second.
DS0-A	A process where a subrate signal (2.4, 4.8, 9.6, 19.2 or 56 kbps) is repeated 20, 10 or 5 times carried over a signal DS0.
DS0-B	A process performed by a subrate mutliplexer where twenty 2.4 kbps, ten 4.8 kbps or five 9.6 kbps signals are multiplexed into one 64 kbps DS0 channel.
DS0	Digital Signal, level zero. A 64 kbps signal. It is equal to one voice conversation digitized under pulse code modulation.
DS1	Digital Signal, level one. A 1.544 Mbps digital signal carried on a T1 transmission facility.
DSP	Digital Signal Processor.
DSU	Data Service Unit.
DSX-1	Digital Signal Cross-connect Level 1. A set of standard electrical parameters for cross-connecting DS1 lines.
DSX	Digital System Cross-connect frame. A bay or panel to which T1 lines and DS1 circuit packs are wired and that permits cross-connections by patch cords and plugs.
DTMF	Dual Tone Multi-Frequency.
E & M	Ear and Mouth.
ERL	Echo Return Loss.

ESF	Extended Super Frame. A T1 format that uses the 193rd bit as a framing bit. ESF provides frame synchronization, cyclic redundancy checking and data link bits.
FXO	Foreign Exchange Office.
FXS	Foreign Exchange Subscriber.
GS	Ground Start.
I/O	Input / Output.
IRE	An IRE is 1/100 part of the luminance (blanking to reference white) range. The zero IRE shall be at the blanking level and 100 IRE at reference white level. IRE below blanking level shall be referred to as negative values.
ISDN	Integrated Services Digital Network.
LBO	Electrical Line Build Out.
LGS	Loop Ground Start.
LS	Loop Start.
OCU	Office Channel Unit.
NTSC	National Television Systems Committee.
PCM	Pulse Code Modulation.
PLAR	Private line, Automatic Ringdown.
PLR	Pulse Link Repeater.
ppm	periodic pulse metering.
QRSS	Quasi Random Signal Source.
SRL	Signal Return Loss.
Switched 56	A switched line digital service provided by the Private Telephone Network. It supports 56,000 bits per second data rate only.
T1	A standard digital transmission link with a capacity of 1.544 Mbps normally handles 24 voice channels at 64 kbps.
TLP	Transmission Level Point.
VF	Voice Frequency.
μ-law	PCM coding and companding standard used in North America.

10-7.01 SYSTEM TESTING AND DOCUMENTATION

DESCRIPTION

The system testing and documentation shall cover pre-installation testing, physical inspection, subsystem testing, fiber optic cable testing, data link testing, acceptance testing, functional testing, performance testing, final acceptance and system documentation that is required to validate the operational performance of the vehicle detection system, closed circuit television, communication system and ramp metering system, as shown on the plans and described elsewhere in these special provisions.

PRE-INSTALLATION TESTING

Pre-inspection testing shall include testing of all material, equipment and cable in a laboratory environment prior to delivery to the site. Use of laboratory facilities, including an environmental simulation chamber, shall be arranged by the Contractor. The tests shall either be conducted at the equipment manufacturer's premises or at a laboratory arranged by the Contractor.

All material, except test equipment and special tools, shall be bench tested in accordance with the following sections, which include those items described elsewhere requiring pre-installation testing..

All active equipment shall be connected to normal operating power, energized and subjected to normal operating conditions for a continuous period of time in the laboratory of not less than 48 hours.

Functional testing shall be performed by the manufacturer on all material prior to delivery to the site. The functional tests shall be performed in accordance with an approved test plan. Any material or equipment which fails to meet the requirements of the contract shall be repaired or replaced and the test shall be repeated until satisfactory. All functional test results, including results of failed tests or re-tests, shall be submitted and delivered with all material and equipment delivered to the site.

Full performance test shall be performed by the manufacturer or by the Contractor on not less than 5 percent or at least one unit of material selected at random from the normal production run. The full performance test shall be performed in accordance with a test plan developed by the Contractor and approved by the Engineer.

The tests shall demonstrate that the design and production of material and equipment meets the requirements of the Contract. Full environmental conditions shall be tested as part of the functional tests for field equipment.

PHYSICAL INSPECTION

The Contractor shall provide documentation to prove delivery of all material, equipment, cable and documentation. If any material or documentation is outstanding or have been replaced under pre-acceptance warranty a physical inspection and documentation shall be provided for this material. The physical inspection shall consist of inspecting all installed material to ensure workmanship satisfies the specified requirements.

SYSTEM DOCUMENTATION

Parts List: The manual shall include a list of all replaceable parts with exact parts description and number and a directory of recommended suppliers with correspondence address, telephone and fax numbers.

Test Results: This section shall include a copy of the results for all the tests that has been conducted for the contract.

System schematic drawings shall be provided to identify the type of equipment at each location and the function of all equipment. The drawings shall also show how the system is interconnected. A comprehensive list of cabling and wiring shall be provided to clearly identify the interconnection and labeling of all equipment supplied under this contract, State-furnished or existing both in the field and at the communication hub.

ACCEPTANCE TESTING

The acceptance testing includes the preparation of an acceptance test plan, conducting acceptance tests and subsequent retests, and documentation of the results.

Final acceptance tests shall be conducted after the site test results have been reviewed and accepted by the Engineer. These tests include the complete system in normal operations.

Installation documentation and test results shall be provided for all material, equipment and cable prior to submission of the acceptance test plan and commencement of acceptance tests. This documentation shall be in accordance with the Contract and shall include the following as appropriate:

- Model and part number for all material.

- Test equipment model number, serial number, settings, and date of last calibration.

- All strap and switch settings.

- Record of all adjustments and levels.

- Alignment measurements.

- Identification of interconnections.

- All factory, laboratory and site test results.

The Contractor shall submit three copies of the acceptance test plan to the Engineer for approval prior to commencement of acceptance testing. The acceptance test plan shall address the full testing requirements of the specifications. The acceptance test plan shall detail all tests to be performed, the test results which are expected and the test schedule. The acceptance test plan will include the following major test and acceptance categories:

- Physical inspection

- Functional tests

- Performance tests

The Contractor shall test the communication system according to the approved acceptance test plan and shall provide all test equipment, labor and ancillary items required to perform the testing. The test equipment shall be certified to be calibrated to the manufacturers' specifications. The model and part numbers and date of last calibration of all test equipment shall be included with the test results.

Acceptance testing shall not commence until all material required by these special provisions and plans are delivered, installed, aligned, all production test and site test documentation and results have been approved by the Engineer.

All acceptance test results shall be fully documented and such documentation provided as a condition of acceptance.

FUNCTIONAL TESTS

The Contractor shall test all system functions to demonstrate the connectivity of each data channel, that all circuits and all equipment satisfies the functional requirements of these special provisions.

The Contractor shall document all functional test results. In the event that any aspect of the functional tests are determined by the Engineer to have failed, the Contractor shall cease all acceptance testing and determine the cause of the failure and make repairs to the satisfaction of the Engineer. Acceptance testing shall, at the discretion of the Engineer, be repeated from the start of functional tests.

Performance Tests.--The Contractor shall conduct operational performance tests on all data circuits operational from the communication hub to the field equipment.

Data tests shall be performed on all operational and voice/data circuits using appropriate test equipment for the measurement of the following parameters:

End-to-end bit error rate tests shall be run from the communication hub to each remote drop of each data circuit. A data test set shall be used at both the communication hub and the remote modems to insert an asynchronous pseudo-random pattern using 8 data bits, 1 start bit, 1 stop bit and even parity. The data test set at the remote modem must hold RTS high for the duration of the data test. The data rate of the test sets shall be set to rate as employed in the system. A 15 minute test on each drop of each multipoint circuit shall be error free in both directions.

One drop of each circuit, as chosen by the Engineer, shall be tested for 48 hours. The average bit error rate in both directions shall be less than 1 in 10^8 .

Pulse-width distortion shall be defined as the difference between the data pulse width into a data channel port at the communication hub port and the pulse width out of the EIA-232D port of an interconnected drop modem.

Distortion shall be tested between the communication hub and the selected field modem for each data circuit. The signal shall not have a gross span-stop distortion greater than 20 percent at any data interface measured as per EIA-404-A.

If any circuit or element fails to satisfy the specified performance requirements the Contractor shall determine the cause and remedy the failure to the satisfaction of the Engineer. The full performance tests shall be repeated under operating conditions as determined by the Engineer.

FINAL ACCEPTANCE

The system will not be accepted until all of the following conditions have been met as follows:

Physical, functional and full performance acceptance tests have been completed and the results are approved by the Engineer.

All documentation has been completed and submitted to the Engineer.

All connections that were changed to perform acceptance tests are restored and tested.

Payment

The contract lump sum price paid for system testing and documentation shall include full compensation for furnishing all labor, materials, tools, equipment, and incidentals, and for doing all the work involved in system testing and documentation, complete in place, as shown on the plans, as specified in the Standard Specifications and these special provisions, and as directed by the Engineer.

SECTION 11. (BLANK)**SECTION 12. (BLANK)****SECTION 13. RAILROAD RELATIONS AND INSURANCE****OVERHEAD AGREEMENT:**

- Redlands Loop Overhead
- 9th Street Overhead
- Baseline Street Overhead
- 16th Street Overhead

OVERHEAD AGREEMENT

BNSF File No. 027207K
 Redlands Loop Overhead
 U.S. D.O.T. No. 027207K

This Agreement ("Agreement"), is executed to be effective as of this 14 day of DECEMBER, 2007 ("Effective Date"), by and between **SAN BERNARDINO ASSOCIATED GOVERNMENTS**, a body corporate and politic of the State of California, hereinafter referred to as ("**SANBAG**") and the **STATE OF CALIFORNIA**, acting through the Department of Transportation, hereinafter referred to as ("**STATE**") and the **BNSF RAILWAY COMPANY**, a Delaware corporation ("**BNSF**").

RECITALS:

WHEREAS, SANBAG owns the Redlands Subdivision, in and through the City of San Bernardino, County of San Bernardino, State of California;

WHEREAS, STATE and The Atchison, Topeka and Santa Fe Railway Company ("**SANTA FE**"), predecessor in interest to BNSF entered into the Redlands Loop Overhead agreement dated October 4, 1956 which provided for the construction and maintenance of the Redlands Loop Overhead, U.S. D.O.T. No. 027207K across the Redlands Subdivision and tracks;

WHEREAS, SANBAG along with various other Southern California Transportation agencies entered into the PURCHASE AND SALE AGREEMENT with SANTA FE, dated October 30, 1992 covering the agencies purchase of various SANTA FE owned rail corridors through the agencies respective jurisdictions which set forth the terms and conditions for SANBAG'S purchase of the Redlands Subdivision;

WHEREAS, SANBAG entered into the SHARED USE AGREEMENT (Redlands Subdivision), with SANTA FE dated October 30, 1992 which sets forth the terms and conditions on how the Redlands Subdivision will be operated and maintained and the requirements for insurance coverage and liability limits for the parties hereto. The terms of the SHARED USE AGREEMENT are incorporated by reference as if set forth in their entirety herein;

WHEREAS, SANTA FE conveyed the Redlands Subdivision to SANBAG by Grant Deed dated March 29, 1993 subject to several permitted exceptions including the SHARED USE AGREEMENT and reserving unto SANTA FE over the Redlands Subdivision a permanent and exclusive rail freight service easement (the Reserved Rail Freight Service Easement) and a license (the "Reserved Rail Freight Service License") that permits SANTA FE'S employees agents, or contractors or freight shippers or freight receivers ingress to and egress from the Redlands Subdivision in connection with the Reserved Rail Freight Service Easement;

WHEREAS; the above referenced Redlands Loop Overhead Agreement was assigned from SANTA FE to SANBAG by virtue of the ASSIGNMENT, ASSUMPTION, INDEMNIFICATION AGREEMENT REGARDING LEASES, LICENSES, OTHER AGREEMENTS AND PERMITS dated March 29, 1993;

WHEREAS, BNSF is currently the only operator over the Redlands Subdivision and will remain so until SANBAG begins to operate "Agency Rail Service." Agency Rail Service means the operation of trains (including light rail service), which are used to provide passenger rail service or any other related rail passenger service excluding Amtrak Service;

WHEREAS, BNSF currently maintains the Redlands Subdivision and will continue to do so until the "Redlands Maintenance Shift Date." The Redlands Maintenance Shift Date means the date on which SANBAG commences Agency Rail Service;

WHEREAS, SANBAG has no plans to commence Agency Rail Service while the project described herein is under construction;

WHEREAS, STATE and SANBAG propose to widen the Redlands Loop Overhead and construct a new northbound off ramp in connection with the widening and improvement of State Route 215 in the manner set forth in the Exhibit A attached hereto and incorporated herein. The new northbound ramp will be constructed over the Redlands Subdivision, also referred to herein as the **Rail Corridor**;

WHEREAS, STATE and SANBAG have entered into a Design Cooperative Agreement, dated February 6, 2002 providing for SANBAG'S design for the expanded State Route 215;

WHEREAS, STATE and SANBAG will enter into a Construction Cooperative Agreement prior to the start of construction of the Project as described in Article I, Section 1 of this Agreement, that will provide for SANBAG'S construction of the Project with STATE owning and maintaining the **Structure** as described in Article I, Section 1.

NOW, THEREFORE, in consideration of the mutual covenants and agreements of the parties contained herein, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

ARTICLE I – SCOPE OF WORK

1. The term "**Project**" as used herein includes any and all work related to the widening of the Redlands Loop Overhead and the construction of the new Northbound Ramp, including, but not limited to, any and all changes to telephone, telegraph, signal and electrical lines and appurtenances, temporary and permanent track work, fencing, grading, alterations to or new construction of drainage facilities, preliminary and construction engineering and contract preparation. The term ("**Structure**") as used in this Agreement, shall mean the Redlands Loop Overhead as widened and improved and shall include the new Northbound Ramp, all Phases, any and all changes to telephone, telegraph, signal and electrical lines and appurtenances, temporary and permanent track work, fencing, grading, alterations to or new construction of drainage facilities, preliminary and construction engineering and contract preparation, more particularly described on the Exhibit A.

2. For the purpose of this agreement the Exhibit B has been purposely eliminated.

ARTICLE II – BNSF OBLIGATIONS

In consideration of the covenants of SANBAG and STATE set forth herein and the faithful performance thereof, BNSF agrees as follows:

1. BNSF will furnish all labor, materials, tools, and equipment for railroad work required for the construction of the Project, such railroad work and the estimated cost thereof being as shown on Exhibit D attached hereto and made a part hereof. In the event construction on the Project has not commenced within six (6) months following the Effective Date, BNSF may, in its sole and absolute discretion, revise the cost estimates set forth in said Exhibit D. In such event, the revised cost estimates will become a part of this Agreement as though originally set forth herein. Any item of work incidental to the items listed on Exhibit D not specifically mentioned therein may be included as a part of this Agreement upon written approval of SANBAG, which approval will not be unreasonably withheld. Construction of the Project will include the following principle elements of railroad work by BNSF:

- (a) Procurement of materials, equipment and supplies necessary for the railroad work;
- (b) Furnishing of flagging services necessary for the safety of SANBAG'S Rail Corridor and property and the operation of BNSF'S trains during construction of the Project as set forth in further detail on Exhibit C, attached to this Agreement and made a part hereof;

- (c) Furnishing engineering and inspection as required in connection with the construction of the Project and;
2. BNSF will do all railroad work set forth in Article II, Section 1 above on an actual cost basis, when BNSF, in its sole discretion, determines it is required by its labor agreements to perform such work with its own employees working under applicable collective bargaining agreements or by contractor(s) if necessary.
 3. SANBAG agrees to reimburse BNSF for work of an emergency nature caused by SANBAG or SANBAG'S contractor in connection with the Project which is reasonably necessary for the immediate restoration of railroad operations, or for the protection of persons or SANBAG property. Such work may be performed by BNSF without prior approval of SANBAG and SANBAG agrees to fully reimburse BNSF for all such emergency work.
 4. During the construction of the Project, BNSF will send SANBAG progressive invoices detailing the costs of the railroad work performed by BNSF under this Agreement. Pursuant to the California Prompt Payment Act, CALIFORNIA CODES, GOVERNMENT CODE, SECTION 927-927.12., SANBAG shall reimburse BNSF for invoiced completed work within forty-five (45) calendar days from the date of SANBAG'S receipt of the invoice for such work. Upon completion of the Project, BNSF will send SANBAG a detailed invoice of final costs, segregated as to labor and materials for each item in the recapitulation shown on Exhibit D. If SANBAG fails to make payment of a BNSF invoice within said forty-five (45) days, SANBAG shall pay a penalty at a rate of 1 percent above the rate accrued on June 30 of the prior year by the Pooled Money Investment Account, not to exceed a rate of 15 percent pursuant to Section 927.6 (b) of said Government Code.

ARTICLE III – SANBAG OBLIGATIONS

In consideration of the covenants of STATE and BNSF set forth herein and the faithful performance thereof, SANBAG agrees as follows:

1. SANBAG shall furnish to BNSF and STATE plans and specifications for the Project. PDF files should be emailed to BNSF'S Manager Public Projects and Assistant Director Structural Engineering. The email addresses are included in Article V, Section 20. Sets of said plans (reduced size 11" x 17"), together with calculations, and specifications with the railroad clearances expressed in **English Units**, shall be submitted to BNSF and STATE for approval prior to commencement of any construction. BNSF will give SANBAG final written approval of the plans and specifications substantially in the form of Exhibit E, attached to this Agreement and made a part hereof. Upon BNSF'S final written approval of the plans and specifications, said plans and specifications will become part of this Agreement and are hereby incorporated herein. Any approval of the plans and specifications by BNSF shall in no way obligate BNSF in any manner with respect to the finished product design and/or construction. Any approval by BNSF shall mean only that the plans and specifications meet BNSF standard specifications, and such approval by BNSF shall not be deemed to mean that the plans and specifications or construction is structurally sound and appropriate or that such plans and specifications meet applicable regulations, laws, statutes or local ordinances and/or building codes.
2. SANBAG shall provide for and maintain minimum vertical and horizontal clearances, not less than the minimum set forth by the Public Utilities Commission of the State of California ("**Commission**") and as required and approved by BNSF as part of the plans and specifications for the Project.
3. SANBAG shall make any and all arrangements for the installation or relocation of wire lines, pipe lines and other facilities owned by private persons, companies, corporations, political subdivisions or public utilities which may be necessary for the construction of the Project.
4. SANBAG shall construct the Project as shown on the attached Exhibit A and do all work ("**SANBAG'S Work**") provided for in the plans and specifications for the Project, except railroad work that will be performed by BNSF herein. SANBAG shall furnish all labor, materials, tools and equipment for the performance of SANBAG'S Work. The principal elements of SANBAG'S Work are as follows:

- (a) Preliminary and final Engineering;
- (b) Design and the Construction of the Project;
- (c) All necessary grading and paving, including backfill of excavations and restoration of disturbed vegetation on said Rail Corridor;
- (d) Provide suitable drainage, both temporary and permanent;
- (e) Apply the D.O.T. Crossing Number 027207K in a conspicuous location on the Structure;
- (f) Job site cleanup to the pre-construction condition and to the satisfaction of BNSF.

5. SANBAG'S Work shall be performed by SANBAG or SANBAG'S contractor in a manner that will not endanger or interfere with the safe and timely operations of BNSF or SANBAG facilities.

6. SANBAG shall require its contractor(s) to notify BNSF'S Roadmaster at least thirty (30) calendar days prior to requesting a BNSF flagman in accordance with the requirements of Exhibit C attached hereto. Additionally, SANBAG shall require its contractor(s) to notify BNSF'S Manager of Public Projects thirty (30) calendar days prior to commencing work on SANBAG'S Rail Corridor or near the railroad tracks.

7. SANBAG or its contractor(s) shall submit any plans by email (including calculations in **English Units**) in PDF format for proposed shoring, falsework or cribbing to be used over, under, or adjacent to BNSF'S tracks to BNSF' S Assistant Director Structural Engineering with a copy to BNSF'S Manager of Public Projects for approval. The email addresses are included in Article V, Section 20. The shoring, falsework or cribbing used by SANBAG'S contractor shall comply with the BNSF Bridge Requirements set forth on Exhibit F, attached to this Agreement and incorporated herein, and all applicable requirements promulgated by state and federal agencies, departments, commissions and other legislative bodies.

8. SANBAG shall include the following provisions in any contract with its contractor(s) performing work on said Project:

- (a) The Contractor is placed on notice that fiber optic, communication and other cable lines and systems (collectively, the "Lines") owned by various telecommunications companies may be buried on SANBAG'S Rail Corridor. The locations of these Lines have been included on the plans based on information from the telecommunications companies. The contractor will be responsible for contacting BNSF'S Project Engineer at telephone number 909-386-4079 and/or the telecommunications companies and notifying them of any work that may damage these Lines or facilities and/or interfere with their service. The contractor shall also mark all Lines shown on the plans or marked in the field in order to verify their locations. The contractor shall also use all reasonable methods when working in SANBAG'S Rail Corridor to determine if any other Lines (fiber optic, cable, communication or otherwise) may exist.
- (b) Failure to mark or identify these Lines will be sufficient cause for any BNSF Representative to stop construction at no cost to SANBAG or BNSF until these items are completed.
- (c) In addition to the liability terms contained elsewhere in this Agreement, the contractor hereby indemnifies, defends and holds harmless SANBAG and BNSF for, from and against all cost, liability, and expense whatsoever (including, without limitation, attorney's fees and court costs and expenses) arising out of or in any way contributed to by any act or omission of Contractor, its subcontractors, agents and/or employees that cause or in any way or degree contribute to (1) any damage to or destruction of

any Lines by Contractor, and/or its subcontractors, agents and/or employees, on SANBAG'S Rail Corridor, (2) any injury to or death of any person employed by or on behalf of any telecommunications company, and/or its contractor, agents and/or employees, on SANBAG'S Rail Corridor, and/or (3) any claim or cause of action for alleged loss of profits or revenue by, or loss of service by a customer or user of such telecommunication company(ies). **THE LIABILITY ASSUMED BY CONTRACTOR WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DAMAGE, DESTRUCTION, INJURY, DEATH, CAUSE OF ACTION OR CLAIM WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF SANBAG BNSF, THEIR AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, EXCEPT TO THE EXTENT THAT SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE WILLFUL MISCONDUCT OR SOLE NEGLIGENCE OF SANBAG or BNSF.**

- (d) The Contractor will be responsible for the rearrangement of any facilities or Lines determined to interfere with the construction. The Contractor shall cooperate fully with any telecommunications company (ies) in performing such rearrangements.

9. SANBAG shall incorporate in each prime contract for construction of the Project, or the specifications therefor (i) the provisions set forth in Article III, Sections 2, 3, 5, 6, 7, 8, and 10; (ii) the provisions set forth in Article V, Sections 1, 2, 3, 4, 5, 7, and 10; and (iii) the provisions set forth in Exhibit C, Exhibit C-I, and Exhibit F attached hereto and by reference made a part hereof.

10. Except as otherwise provided below in this Section 10, all construction work performed hereunder by SANBAG for the Project will be pursuant to a contract or contracts to be let by SANBAG, and all such contracts shall include the following:

- (a) ~~All work performed under such contract or contracts within the limits of SANBAG'S Rail Corridor shall be performed in a good and workmanlike manner in accordance with plans and specifications approved by BNSF;~~
- (b) Changes or modifications during construction that affect safety or BNSF operations shall be subject to BNSF'S approval;
- (c) No work will be commenced within SANBAG'S Rail Corridor until each of the prime contractors employed in connection with said work shall have (i) executed and delivered to BNSF a letter agreement in the form of Exhibit C-I, and (ii) delivered to and secured BNSF'S approval of the required insurance; and
- (d) If it is in SANBAG's best interest, SANBAG may direct that the construction of the Project be done by day labor under the direction and control of SANBAG, or if at any time, in the opinion of SANBAG, the contractor has failed to prosecute with diligence the work specified in and by the terms of said contract, SANBAG may terminate its contract with the contractor and take control over the work and proceed to complete the same by day labor or by employing another contractor(s) provided; however, that any contractor(s) replacing the original contractor(s) shall comply with the obligations in favor of BNSF set forth above and, provided further, that if such construction is performed by day labor, SANBAG will, at its expense, procure and maintain on behalf of BNSF the insurance required by the SHARED USE AGREEMENT referenced herein above.
- (e) To facilitate scheduling for the Project BNSF will meet with the contractor in advance of commencing work and develop a construction schedule for the Project. BNSF will arrange to take the Redlands Subdivision out of service on the days that BNSF customarily does not operate over this line. BNSF will schedule a flagman for those days that BNSF will operate over this line. Should BNSF find it necessary to operate over this line on a day that the line has been or will be taken out of service, BNSF will give SANBAG'S contractor sufficient advance notice to clear the track and BNSF will provide a flagman for movement trains through the Project site. All flagmen provided by BNSF are at SANBAG'S expense pursuant to Article II, Section 4 above.

- (f) SANBAG shall have its contractor provide BNSF'S Project Engineer at telephone number 909 386 4079 two (2) weeks advance notice of any proposed changes the contractor desires to make to the construction schedule.
 - (g) BNSF has the right at any time to revise or change the days or times of its operations over this line due to service obligations. BNSF will not be responsible for any additional costs and expenses resulting from changes in its operations. Additional costs and expenses resulting from a change in train operations shall be accounted for in the contractor's expenses for the Project.
 - (h) The plans and specifications for the Project shall be in compliance with the Bridge Requirements set forth on said Exhibit F.
11. SANBAG shall advise BNSF'S Manager of Public Projects, in writing, of the completion date of the Project within thirty (30) days after such completion date. Additionally, SANBAG shall notify BNSF'S Manager of Public Projects, in writing, of the date on which SANBAG, and/or STATE and/or SANBAG'S Contractor will meet with BNSF for the purpose of making final inspection of the Project.
12. **SANBAG HAS PROVIDED INDEMINIFICATION TO BNSF PURSUANT TO THE TERMS OF THE SHARED USE AGREEMENT REFERENCED HEREIN ABOVE.**
13. SANBAG shall give BNSF'S Manager of Public Projects written notice to proceed ("**Notice to Proceed**") with the railroad work after receipt of necessary funds for the Project. BNSF will not begin the railroad work (including, without limitation, procurement of supplies, equipment or materials) until written notice to proceed is received from SANBAG. The Notice to Proceed shall reference BNSF'S file number 027207K.

ARTICLE IV - STATE OBLIGATIONS

IN CONSIDERATION of the covenants of SANBAG and BNSF herein contained and the faithful performance thereof, STATE agrees:

1. To permit SANBAG to act as the responsible lead agency to design and construct the Project.
2. STATE shall make application to the Commission for an order authorizing construction of the Project and to furnish to the Commission plans of the proposed construction, approved by BNSF, together with a copy of this agreement and to and obtain all other required permits and approvals for the construction of the Project.
3. STATE will acquire all property rights required to construct the Project and maintain the Structure;
4. In addition to the terms and conditions set forth elsewhere in this Agreement, including, but not limited to, the terms and conditions stated in Exhibit F, STATE and BNSF agree to the following terms upon completion of construction of the Project:
 - (a) STATE will own and maintain, at its sole cost and expense, the Structure, the highway approaches, and appurtenances thereto, lighting, drainage;
 - (b) STATE will arrange for removal of graffiti from the Structure;
 - (c) STATE shall maintain said D.O.T. Crossing Number 027207K in good readable condition in the conspicuous location on the Structure where applied by SANBAG during construction;
 - (d) It is understood by STATE that the right to install utilities is restricted to the placement of underground utilities beneath SANBAG'S tracks located a minimum of fifty (50) feet from

abutments, piers, piles, or footings with the exception that upon SANBAG'S prior approval SANBAG will permit selected utilities to be run through the deck of the Structure. Under no circumstances will utilities be allowed to hang from the Structure. All utility crossings within the limits of SANBAG'S Rail Corridor will be covered by separate agreements between SANBAG and each of the owners of the utilities.

- (e) Upon request from SANBAG or BNSF, STATE shall remove all trash and debris associated with the Structure from SANBAG'S Rail Corridor.
- (f) In conformance with and limited to the applicable effect of California Laws insofar as the indemnity and insurance provisions set forth in any of the preceding sections or any rider, amendment or addendum hereto, State is self-insured. If State performs (i) alterations or modifications to the Structure, or (ii) any maintenance or other work on the Structure with heavy tools, equipment or machinery at ground surface level horizontally within 25'-0" of the centerline of the nearest track, or (iii) any maintenance or other work outside the limits of the deck of the Structure vertically above the top of the rail, then STATE, shall provide SANBAG and BNSF defense and indemnification at least equal to the defense, indemnification and insurance provisions contained in Exhibit C 1. in accordance with California Government Code section 14662.5. Nothing herein shall be deemed to insure SANBAG or BNSF against its sole negligence or willful misconduct.

In the event any of the Work to be done on behalf of STATE upon the property of SANBAG is to be done by a contractor or subcontractor, said contractor or subcontractor shall provide to SANBAG the insurance policies, certificates, binders, and/or endorsements in favor of SANBAG and a separate policy in favor of BNSF as contained in said Exhibit C-1 as the same may be revised from time to time.

5. STATE shall notify and obtain prior authorization from BNSF'S Manager of Public Projects before entering SANBAG'S Rail Corridor for maintenance purposes if BNSF is maintaining the Redlands Subdivision at the time maintenance is to be performed. If the construction work hereunder is contracted, STATE shall require its prime contractor(s) to comply with the obligations set forth in Exhibit C, Exhibit C-1 and Exhibit F, as the same may be revised from time to time. STATE will be responsible for its contractor(s) compliance with such obligations.

6. STATE shall notify and obtain prior authorization from the Manager of Public Projects for **SOUTHERN CALIFORNIA REGIONAL RAIL AUTHORITY** hereinafter referred to as ("**SCRRA**"), with SCRRA serving as an agent for SANBAG, before entering SANBAG'S Rail Corridor for maintenance purposes if SANBAG is maintaining the Redlands Subdivision at the time maintenance is to be performed. If the construction work hereunder is contracted, STATE shall require its prime contractor(s) to comply with SCRRA's obligations and requirements that are in effect at the time. STATE will be responsible for its contractor(s) compliance with such obligations.

7. **PURSUANT TO CALIFORNIA GOVERNMENT CODE SECTION 14662.5, STATE HEREBY AGREES TO INDEMNIFY AND HOLD HARMLESS SANBAG FROM, AND TO REPAIR OR PAY FOR, ANY DAMAGE PROXIMATELY CAUSED BY REASON OF THE USES AUTHORIZED BY ANY EASEMENT OR RIGHT GRANTED TO THE STATE FOR THE PURPOSE OF CONSTRUCTING AND MAINTAINING THE STRUCTURE.**

ARTICLE V – JOINT OBLIGATIONS

IN CONSIDERATION of the premises, the parties hereto mutually agree to the following:

1. All work contemplated in this Agreement shall be performed in a good and workmanlike manner and each portion shall be promptly commenced by the party obligated hereunder to perform the same

and thereafter diligently prosecuted to conclusion in its logical order and sequence. Furthermore, any changes or modifications during construction which affect BNSF will be subject to BNSF'S approval prior to the commencement of any such changes or modifications.

2. The work hereunder shall be done in accordance with the Bridge Requirements set forth on Exhibit F and the detailed plans and specifications approved by BNSF.

3. SANBAG shall require its contractor(s) to reasonably adhere to the Project's construction schedule for all Project work. The parties hereto mutually agree that BNSF'S failure to complete the railroad work in accordance with the construction schedule due to inclement weather or unforeseen railroad emergencies will not constitute a breach of this Agreement by BNSF and will not subject BNSF to any liability. Regardless of the requirements of the construction schedule, BNSF reserves the right to reallocate the labor forces assigned to complete the railroad work in the event of an emergency to provide for the immediate restoration of railroad operations (BNSF or its related railroads) or to protect persons or property on or near any BNSF owned property or on or near SANBAG'S Rail Corridor. BNSF will not be liable for any additional costs or expenses resulting from any such reallocation of its labor forces. The parties mutually agree that any reallocation of labor forces by BNSF pursuant to this provision and any direct or indirect consequences or costs resulting from any such reallocation will not constitute a breach of this Agreement by BNSF.

4. BNSF shall have the right to request any SANBAG employee, SANBAG Contractor employee, or STATE employee, who enters SANBAG'S Rail Corridor and because of their incompetence, neglect of duty, unsafe conduct or misconduct and/or they adversely affected BNSF'S operations, be removed from the said Rail Corridor. In the event SANBAG, or STATE elects not to honor such request, BNSF may stop work within said Rail Corridor until the matter has been fully resolved to BNSF'S satisfaction. The party whose employee has been asked to leave the Rail Corridor will indemnify BNSF and the other parties against any claims arising from such removal.

5. BNSF will have the right to stop construction work on the Project if any of the following events take place: (i) SANBAG (or any of its contractors) performs the Project work in a manner contrary to the plans and specifications approved by BNSF; (ii) SANBAG (or any of its contractors) prosecutes the Project work in a manner which is hazardous to SANBAG'S Rail Corridor, facilities or the safe and expeditious movement of BNSF'S railroad traffic; or (iii) the insurance described in the attached Exhibit C-1 is canceled during the course of the Project. The work stoppage will continue until all necessary actions are taken by SANBAG or its contractor to rectify the situation to the satisfaction of BNSF'S Division Engineer or until additional insurance has been delivered to and accepted by BNSF. Any such work stoppage under this provision will not give rise to any liability on the part of BNSF. BNSF'S right to stop the work is in addition to any other rights BNSF may have including, but not limited to, actions or suits for damages or lost profits. In the event that BNSF desires to stop construction work on the Project, BNSF agrees to immediately notify the following individual in writing:

SANBAG Director of Freeway Construction
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410
Fax: (909) 388-2002.

6. SANBAG'S or any STATE employee, agents, contractors, representatives and invitees shall wear Personal Protective Equipment ("PPE") when on SANBAG'S Rail Corridor during construction of the Project or performing subsequent maintenance after completion of construction. The PPE shall meet applicable OSHA and ANSI specifications. Current BNSF PPE requirements are listed on the web site, www.contractororientation.com. A partial list of BNSF'S PPE requirements include; a) safety glasses: permanently affixed side shields; no yellow lenses, b) hard hats with high visibility orange cover, c) safety shoes: hardened toe, above-the-ankle lace-up with a defined heel and d), high visibility retro-reflective orange vests are required as specified by BNSF'S representative in charge of the Project. PPE requirements as defined on the web site, will be amended from time to time, and shall take precedence over the Partial list of requirements outlined in this Section 6 of Article V. Hearing protection, fall protection and respirators will be worn as required by State and Federal regulations.

7. SANBAG shall supervise and inspect the operations of all SANBAG contractors to assure compliance with the plans and specifications approved by BNSF, the terms of this Agreement and all safety requirements of the BNSF railroad. If BNSF determines that proper supervision and inspection is not being performed by SANBAG personnel at any time during construction of the Project, BNSF has the right to stop construction (within or adjacent to the Rail Corridor). Construction of the Project will not proceed until SANBAG corrects the situation to BNSF'S reasonable satisfaction. If BNSF feels the situation is not being corrected in an expeditious manner, BNSF will immediately notify SANBAG Director of Freeway Construction for appropriate corrective action.

8. Pursuant to this section and Article II, Section 4 herein, SANBAG shall, reimburse BNSF in full for the actual costs of all work performed by BNSF under this Agreement.

9. All expenses detailed in statements sent to SANBAG pursuant to Article II, Section 4 herein will comply with the terms and provisions of the Federal Aid Highway Program Manual, U.S. Department of Transportation, as amended from time to time, which manual is hereby incorporated into and made a part of this Agreement by reference.

10. Construction of the Project will not commence until SANBAG gives BNSF'S Manager of Public Projects thirty (30) days prior written notice of such commencement. The commencement notice will reference BNSF'S file number 027207K and shall state the time that construction activities will begin.

11. SANBAG may, at its expense, make future changes or additions to the railroad components of the Structure if necessary or desirable, in SANBAG'S sole discretion, including, without limitation the following: (i) the right to raise or lower the grade or change the alignment of its tracks, (ii) the right to lay additional track or tracks, or (iii) the right to build other facilities in connection with the operation of its railroad. Such changes or additions shall not change or alter the highway components of the Structure. If it becomes necessary or desirable in the future to change, alter, widen or reconstruct the highway components of the Structure to accommodate railroad projects, the cost of such work, including any cost incidental to alteration of railroad or highway facilities made necessary by any such changes to the Structure, will be divided between SANBAG and STATE in such shares as may be mutually agreed to by the parties hereto. Any alteration or reconstruction of the highway components of the Structure will be covered by a Commission order.

12. STATE may, at STATE's sole expense, alter or reconstruct the highway components of the Structure if necessary or desirable, due to traffic conditions or pedestrian or other recreational traffic, provided, however, that any such alteration or reconstruction shall not encroach further upon or occupy the surface of SANBAG'S Rail Corridor to a greater extent than is contemplated by the plans and specifications to be approved pursuant to Article III, Section 1 herein, without obtaining SANBAG'S prior written consent and the execution of a supplement to this Agreement or the completion of a separate agreement. Any alteration or reconstruction of the highway components of the Structure will be covered by a Commission order.

13. Any books, papers, records and accounts of the parties hereto relating to the work hereunder or the costs or expenses for labor and material connected with the construction will at all reasonable times be open to inspection and audit by the agents and authorized representatives of the parties hereto and the Federal Highway Administration, for a period of three (3) years from the date of the final BNSF invoice under this Agreement.

14. The covenants and provisions of this Agreement are binding upon and inure to the benefit of the successors and assigns of the parties hereto. Notwithstanding the preceding sentence, neither party hereto may assign any of its rights or obligations hereunder without the prior written consent of the other party.

15. In the event construction of the Project does not commence within three (3) years of the Effective Date, this Agreement will become null and void.

16. Neither termination nor expiration of this Agreement will release any party from any liability or obligation under this Agreement, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination or expiration.

17. To the maximum extent possible, each provision of this Agreement will be interpreted in such a manner as to be effective and valid under applicable law. If any provision of this Agreement is prohibited by, or held to be invalid under, applicable law, such provision will be ineffective solely to the extent of such prohibition or invalidity and the remainder of the provision will be enforceable.

18. The aforesaid Redlands Loop Overhead Agreement, dated October 4, 1956, originally between the STATE and SANTA FE and subsequently assigned to SANBAG shall terminate on the completion date of the Project as provided for in Article III, Section 11 of this Agreement. Such termination shall not release any party thereto from any liability or obligation thereunder, resulting from any act, omission or event happening prior to the date of termination or thereafter, in the event the terms of said agreement provide that anything shall or may be done after termination thereof.

19. This Agreement (including exhibits and other documents, manuals, etc. incorporated herein) is the full and complete agreement between SANBAG, STATE and BNSF with respect to the subject matter herein and supersedes any and all other prior agreements between the parties hereto.

20. Any notice provided for herein or concerning this Agreement shall be in writing and will be deemed sufficiently given when sent by certified mail, return receipt requested, to the parties at the following addresses:

SANBAG:

San Bernardino Associated Governments
1170 W. 3rd Street, 2nd. Floor
San Bernardino, CA 92410
Attn. Director of Freeway Construction
Fax: 909 388 2002

STATE:

Department of Transportation
Division of Right of Way – Railroad Agreements
1120 N. Street, MS 37
Sacramento, CA. 95814

SCRRA:

Southern California Regional Rail Authority
Manager of Public Projects
700 South Flower Street, 26th. Floor
Los Angeles, CA. 90017-4101
Phone: 213 452 0249
Fax: 213 452 0423
Email: mathieur@scrra.net

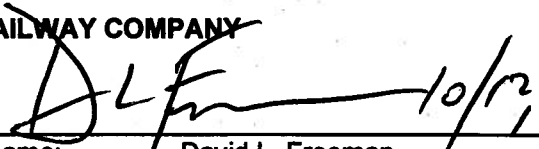
BNSF:

BNSF Railway Company
Manager of Public Projects
740 E. Carnegie Drive
San Bernardino, CA. 92408
Email: Melvin.Thomas@bnsf.com

BNSF Railway Company
Assistant Director Structural Engineering
4515 Kansas Avenue
Kansas City, KS 66106
Email: Donald.Lozano@bnsf.com

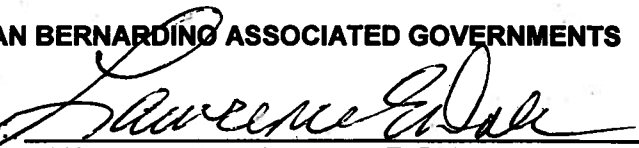
IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed and attested by its duly qualified and authorized officials as of the day and year first above written.

BNSF RAILWAY COMPANY

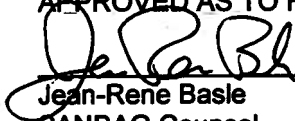
By:  10/12
Printed Name: David L. Freeman
Title: Vice President Engineering

WITNESS:

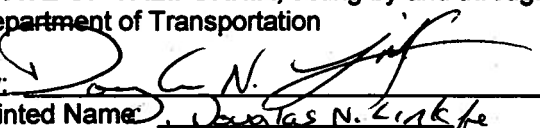
SAN BERNARDINO ASSOCIATED GOVERNMENTS

By: 
Printed Name: Lawrence E. Dale
Title: President - Board of Directors

APPROVED AS TO FORM:


Jean-Rene Basle
SANBAG Counsel

**STATE OF CALIFORNIA, acting by and through its
Department of Transportation**

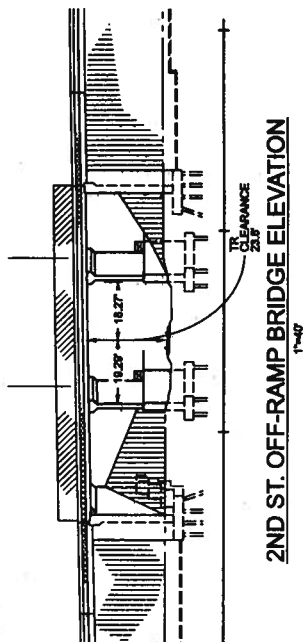
By: 
Printed Name: Douglas N. Linkfe
Title: Chief, Office of Project Delivery
Division of Right of Way


Attorney
Department of Transportation

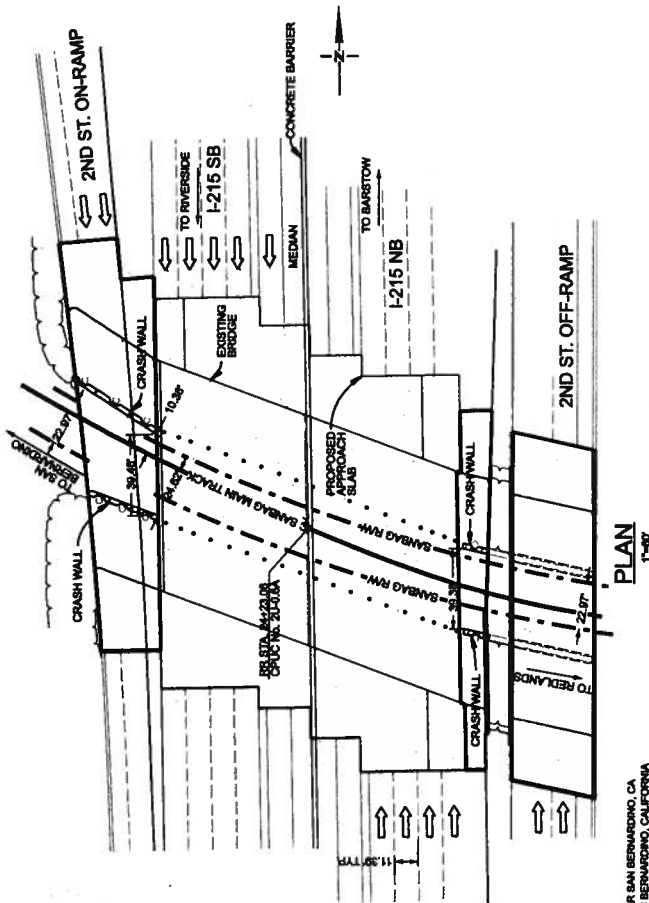

Approval Recommended
Department of Transportation

Redlands Loop Overhead Clean Copy September 13, 2007

AT SAN BERNARDINO, CALIFORNIA
SCALE: AS NOTED
REDLANDS SUBDIVISION



TYPICAL SECTION FACING NORTH



PLAN
1"=40'

NEAR SAN BERNARDINO, CA
SAN BERNARDINO, CALIFORNIA

EXHIBIT "A"

The existing Redlands Loop Overhead was constructed with 3 span pre-cast, pre-stressed concrete girders, on concrete columns and abutments.

This existing structure will be widened approximately 30 feet on the west side and 15 feet on the east side with 3 span pre-cast, pre-stressed concrete girders on concrete columns and abutments for the portion to be widened.

The new northbound off-ramp bridge will be constructed with a 3 span cast in place, pre-stressed concrete voided slab approximately 18 inches thick on concrete columns and abutments.

The widening and new construction are shown hereon in bold.

EXHIBIT "C"
CONTRACTOR REQUIREMENTS
for
REDLANDS LOOP OVERHEAD

1.01 General

- **1.01.01** The Contractor must cooperate with **BNSF RAILWAY COMPANY**, hereinafter referred to as "Railway" where work is over or under on or adjacent to **SAN BERNARDINO ASSOCIATED GOVERNMENTS "SANBAG" Rail Corridor and/or Right-of-Way**, hereafter referred to as "Rail Corridor", during the construction of Redlands Loop Street Overhead.
- **1.01.02** The Contractor must execute and deliver to the Railway duplicate copies of the Exhibit "C-1" Agreement, in the form attached hereto, obligating the Contractor to provide and maintain in full force and effect the insurance called for under Section 3 of said Exhibit "C-1".
- **1.01.03** The Contractor must plan, schedule and conduct all work activities so as not to interfere with the movement of any trains on the Rail Corridor.
- **1.01.04** The Contractor's right to enter the Rail Corridor is subject to the absolute right of Railway to cause the Contractor's work on the Rail Corridor to cease if, in the opinion of Railway, Contractor's activities create a hazard to the Rail Corridor, or Railway's employees, and/or operations.
- **1.01.05** The Contractor is responsible for determining and complying with all Federal, State and Local Governmental laws and regulations, including, but not limited to environmental laws and regulations (including but not limited to the Resource Conservation and Recovery Act, as amended; the Clean Water Act, the Oil Pollution Act, the Hazardous Materials Transportation Act, CERCLA), and health and safety laws and regulations. The Contractor hereby indemnifies, defends and holds harmless Railway for, from and against all fines or penalties imposed or assessed by Federal, State and Local Governmental Agencies against the Railway which arise out of Contractor's work under this Agreement.
- **1.01.06** The Contractor must notify the (Agency) at _____ and Railway's Manager Public Projects, telephone number (909) 386-4472 at least thirty (30) calendar days before commencing any work on the Rail Corridor. Contractors notification to Railway, must refer to Railroad's file 027207K.
- **1.01.07** For any falsework above any tracks or any excavations located, whichever is greater, within twenty-five (25) feet of the nearest track or intersecting a slope from the plane of the top of rail on a 1 ½ horizontal to 1 vertical slope beginning at eleven (11) feet from centerline of the nearest track, both measured perpendicular to center line of track, the Contractor must furnish the Railway five sets of working drawings showing details of construction affecting the Rail Corridor and tracks. The working drawing must include the proposed method of installation and removal of falsework, shoring or cribbing, not included in the contract plans and two sets of structural calculations of any falsework, shoring or cribbing. All calculations must take into consideration railway surcharge loading and must be designed to meet American Railway Engineering and Maintenance-of-Way Association (previously known as American Railway Engineering Association) Coopers E-80 live loading standard. All drawings and calculations must be stamped by a registered professional engineer licensed to practice in the state the project is located. The Contractor must not begin work until notified by the Railway that the plans have been approved. The Contractor will be required to use lifting devices such as, cranes and/or winches to place or to remove any falsework over the Rail Corridor's tracks. In no case will the Contractor be relieved of responsibility for results obtained by the implementation of said approved plans.
- **1.01.08** Subject to the movement of Railway's trains, Railway will cooperate with the Contractor such that the work may be handled and performed in an efficient manner. The Contractor will have no claim whatsoever for any type of damages or for extra or additional compensation in the event his work is delayed by the Railway.

1.02 Contractor Safety Orientation

- **1.02.01** No employee of the Contractor, its subcontractors, agents or invitees may enter the Rail Corridor without first having completed Railway's Engineering Contractor Safety Orientation, found on the web site www.contractororientation.com. The Contractor must ensure that each of its employees, subcontractors, agents or invitees completes Railway's Engineering Contractor Safety Orientation through internet sessions before any work is performed on the Project. Additionally, the Contractor must ensure that each and every one of its employees, subcontractors, agents or invitees possesses a card certifying completion of the Railway Contractor Safety Orientation before entering the Rail Corridor. The Contractor is responsible for the cost of the Railway Contractor Safety Orientation. The Contractor must renew the Railway Contractor Safety Orientation annually. Further clarification can be found on the web site or from the Railway's Representative.

1.03 Railway Requirements

- **1.03.01** The Contractor must take protective measures as are necessary to keep railway facilities, including track ballast, free of sand, debris, and other foreign objects and materials resulting from his operations. Any damage to railway facilities resulting from Contractor's operations will be repaired or replaced by Railway and the cost of such repairs or replacement must be paid for by the Agency.
- **1.03.02** The Contractor must notify the Railway's General Manager Michael Shircliff at telephone 909) 386 4150 Fax 909 386 4111 and provide blasting plans to the Railway for review seven (7) calendar days prior to conducting any blasting operations adjacent to or on the Rail Corridor.
- **1.03.03** The Contractor must abide by the following temporary clearances during construction:
 - 10' 0" Horizontally from centerline of nearest track
 - 21'-6" Vertically above top of rail
 - 27'-0" Vertically above top of rail for electric wires carrying less than 750 volts
 - 28'-0" Vertically above top of rail for electric wires carrying 750 volts to 15,000 volts
 - 30'-0" Vertically above top of rail for electric wires carrying 15,000 volts to 20,000 volts
 - 34'-0" Vertically above top of rail for electric wires carrying more than 20,000 volts
- **1.03.04** Upon completion of construction, the following clearances shall be maintained:
 - 10.38' Horizontally from centerline of nearest track
 - 23.65' Vertically above top of rail
- **1.03.05** Any infringement within State statutory clearances due to the Contractor's operations must be submitted to the Railway and to the (Agency) _____ and must not be undertaken until approved in writing by the Railway, and until the (Agency) _____ has obtained any necessary authorization from the State Regulatory Authority for the infringement. No extra compensation will be allowed in the event the Contractor's work is delayed pending Railway approval, and/or the State Regulatory Authority's approval.
- **1.03.06** In the case of impaired vertical clearance above top of rail, Railway will have the option of installing tell-tales or other protective devices Railway deems necessary for protection of Railway operations. The cost of tell-tales or protective devices will be borne by the Agency.
- **1.03.07** The details of construction affecting the Rail Corridor and tracks not included in the contract plans must be submitted to the Railway by (Agency) _____ for approval before work is undertaken and this work must not be undertaken until approved by the Railway.
- **1.03.08** At other than public road crossings, the Contractor must not move any equipment or materials across the Rail Corridor or tracks until permission has been obtained from the Railway. The Contractor must obtain a "Temporary Private Crossing Agreement" from SANBAG and be approved by the Railway prior to moving his equipment or materials across the Rail Corridor's tracks. The temporary crossing must be gated and locked at all times when not required for use by the Contractor. The temporary crossing for use of the Contractor will be at the expense of the Contractor.

- **1.03.09** Discharge, release or spill on the Rail Corridor of any hazardous substances, oil, petroleum, constituents, pollutants, contaminants, or any hazardous waste is prohibited and Contractor must immediately notify the Railway's Resource Operations Center at 1(800) 832-5452, of any discharge, release or spills in excess of a reportable quantity. Contractor must not allow Rail Corridor to become a treatment, storage or transfer facility as those terms are defined in the Resource Conservation and Recovery Act or any state analogue.
- **1.03.10** The Contractor upon completion of the work covered by this contract, must promptly remove from the Rail Corridor all of Contractor's tools, equipment, implements and other materials, whether brought upon said Corridor by said Contractor or any Subcontractor, employee or agent of Contractor or of any Subcontractor, and must cause Rail Corridor to be left in a condition acceptable to the Railway's representative.

1.04 Contractor Roadway Worker on Track Safety Program and Safety Action Plan

- **1.04.01** Each Contractor that will perform work within 25 feet of the centerline of a track must develop and implement a Roadway Worker Protection/On Track Safety Program and work with Railway Project Representative to develop an on track safety strategy as described in the guidelines listed in the on track safety portion of the Safety Orientation. This Program must provide Roadway Worker protection/on track training for all employees of the Contractor, its subcontractors, agents or invitees. This training is reinforced at the job site through job safety briefings. Additionally, each Contractor must develop and implement the Safety Action Plan, as provided for on the web site www.contractororientation.com, which will be made available to Railway prior to commencement of any work on the Rail Corridor. During the performance of work, the Contractor must audit its work activities. The Contractor must designate an on-site Project Supervisor who will serve as the contact person for the Railway and who will maintain a copy of the Safety Action Plan, safety audits, and Material Safety Datasheets (MSDS), at the job site.

1.05 Protection of Railway Facilities and Railway Flagger Services:

- **1.05.01** The Contractor must give Railway's Roadmaster (telephone 909 386 4061) a minimum of thirty (30) calendar days advance notice when flagging services will be required so that the Roadmaster can make appropriate arrangements (i.e., bulletin the flagger's position). If flagging services are scheduled in advance by the Contractor and it is subsequently determined by the parties hereto that such services are no longer necessary, the Contractor must give the Roadmaster five (5) working days advance notice so that appropriate arrangements can be made to abolish the position pursuant to union requirements.
- **1.05.02** Unless determined otherwise by Railway's Project Representative, Railway flagger and protective services and devices will be required and furnished when Contractor's work activities are located over, under and/or within twenty-five (25) feet measured horizontally from centerline of the nearest track and when cranes or similar equipment positioned beyond 25-feet from the track centerline could foul the track in the event of tip over or other catastrophic occurrence, but not limited thereto for the following conditions:
 - **1.05.02a** When in the opinion of the Railway's Representative it is necessary to safeguard Rail Corridor, employees, trains, engines and facilities.
 - **1.05.02b** When any excavation is performed below the bottom of tie elevation, if, in the opinion of Railway's representative, track or other Rail Corridor facilities may be subject to movement or settlement.
 - **1.05.02c** When work in any way interferes with the safe operation of trains at timetable speeds.
 - **1.05.02d** When any hazard is presented to Railway track, communications, signal, electrical, or other facilities either due to persons, material, equipment or blasting in the vicinity.
 - **1.05.02e** Special permission must be obtained from the Railway before moving heavy or cumbersome objects or equipment which might result in making the track impassable.
- **1.05.03** Flagging services will be performed by qualified Railway flaggers.

- **1.05.03a** Flagging crew generally consists of one employee. However, additional personnel may be required to protect the Rail Corridor and Railway's operations, if deemed necessary by the Railways Representative.
- **1.05.03b** Each time a flagger is called, the minimum period for billing will be the eight (8) hour basic day.
- **1.05.03c** The cost of flagger services provided by the Railway, when deemed necessary by the Railway's representative, will be borne by the (Agency)_____. The estimated cost for one (1) flagger is \$600.00 for an eight (8) hour basic day with time and one-half or double time for overtime, rest days and holidays. The estimated cost for each flagger includes vacation allowance, paid holidays, Railway and unemployment insurance, public liability and property damage insurance, health and welfare benefits, transportation, meals, lodging and supervision. Negotiations for Railway labor or collective bargaining agreements and rate changes authorized by appropriate Federal authorities may increase actual or estimated flagging rates. The flagging rate in effect at the time of performance by the Contractor hereunder will be used to calculate the actual costs of flagging pursuant to this paragraph.
- **1.05.03d** The average train traffic on this route is 1 freight train round trip, two times per week, at a timetable speed of 10 MPH on the Rail Corridor.

1.06 Contractor General Safety Requirements

- **1.06.01** Work in the proximity of the Rail Corridor's track(s) is potentially hazardous where movement of trains and equipment can occur at any time and in any direction. All work performed by contractors within 25 feet of any track must be in compliance with FRA Roadway Worker Protection Regulations.
- **1.06.02** Before beginning any task on the Rail Corridor, a thorough job safety briefing must be conducted with all personnel involved with the task and repeated when the personnel or task changes. If the task is within 25 feet of any track, the job briefing must include the Railway's flagger, as applicable, and include the procedures the Contractor will use to protect its employees, subcontractors, agents or invitees from moving any equipment adjacent to or across any Rail Corridor track(s).
- **1.06.03** Workers must not work within 25 feet of the centerline of any track without an on track safety strategy approved by the Railway's Project Representative. When authority is provided, every contractor employee must know: (1) who the Railway flagger is, and how to contact the flagger, (2) limits of the authority, (3) the method of communication to stop and resume work, and (4) location of the designated places of safety. Persons or equipment entering flag/work limits that were not previously job briefed, must notify the flagger immediately, and be given a job briefing when working within 25 feet of the center line of track.
- **1.06.04** When Contractor employees are required to work on the Rail Corridor after normal working hours or on weekends, the Railroad's representative in charge of the project must be notified. A minimum of two employees must be present at all times.
- **1.06.05** Any employees, agents or invitees of Contractor or its subcontractors under suspicion of being under the influence of drugs or alcohol, or in the possession of same, will be removed from the Rail Corridor and subsequently released to the custody of a representative of Contractor management. Future access to the Rail Corridor by that employee will be denied.
- **1.06.06** Any damage to the Rail Corridor, or any hazard noticed on passing trains must be reported immediately to the Railway's representative in charge of the project. Any vehicle or machine which may come in contact with track, signal equipment, or structure (bridge) and could result in a train derailment must be reported immediately to the Railway representative in charge of the project and to the Railway's Resource Operations Center at 1(800) 832-5452. Local emergency numbers are to be obtained from the Railway representative in charge of the project prior to the start of any work and must be posted at the job site.
- **1.06.07** For safety reasons, all persons are prohibited from having pocket knives, firearms or other deadly weapons in their possession while working on the Rail Corridor.

- **1.06.08** All personnel protective equipment (PPE) used on the Rail Corridor must meet applicable OSHA and ANSI specifications. Current Railway personnel protective equipment requirements are listed on the web site, www.contractororientation.com, however, a partial list of the requirements include: a) safety glasses with permanently affixed side shields (no yellow lenses); b) hard hats c) safety shoe with: hardened toes, above-the-ankle lace-up and a defined heel; and d) high visibility retro-reflective work wear. The Railroad's representative in charge of the project is to be contacted regarding local specifications for meeting requirements relating to hi-visibility work wear. Hearing protection, fall protection, gloves, and respirators must be worn as required by State and Federal regulations. **(NOTE – Should there be a discrepancy between the information contained on the web site and the information in this paragraph, the web site will govern.)**
- **1.06.09** The Contractor must not pile or store any materials, machinery or equipment closer than 25'-0" to the center line of the nearest Rail Corridor track. Materials, machinery or equipment must not be stored or left within 250 feet of any highway/rail at-grade crossings, where storage of the same will interfere with the sight distances of motorists approaching the crossing. Prior to beginning work, the Contractor must establish a storage area with concurrence of the Railroad's representative.
- **1.06.10** Machines or vehicles must not be left unattended with the engine running. Parked machines or equipment must be in gear with brakes set and if equipped with blade, pan or bucket, they must be lowered to the ground. All machinery and equipment left unattended on Rail Corridor must be left inoperable and secured against movement. (See internet Engineering Contractor Safety Orientation program for more detailed specifications)
- **1.06.11** Workers must not create and leave any conditions at the work site that would interfere with water drainage. Any work performed over water must meet all Federal, State and Local regulations.
- **1.06.12** All power line wires must be considered dangerous and of high voltage unless informed to the contrary by proper authority. For all power lines the minimum clearance between the lines and any part of the equipment or load must be; 200 KV or below - 15 feet; 200 to 350 KV - 20 feet; 350 to 500 KV - 25 feet; 500 to 750 KV - 35 feet; and 750 to 1000 KV - 45 feet. If capacity of the line is not known, a minimum clearance of 45 feet must be maintained. A person must be designated to observe clearance of the equipment and give a timely warning for all operations where it is difficult for an operator to maintain the desired clearance by visual means.

1.07 Excavation

- **1.07.01** Before excavating, the Contractor must determine whether any underground pipe lines, electric wires, or cables, including fiber optic cable systems are present and located within the Project work area. The Contractor must determine whether excavation on Rail Corridor could cause damage to buried cables resulting in delay to Railway traffic and disruption of service to users. Delays and disruptions to service may cause business interruptions involving loss of revenue and profits. Before commencing excavation, the Contractor must contact BNSF's Project Engineer (909 386 4079). All underground and overhead wires will be considered HIGH VOLTAGE and dangerous until verified with the company having ownership of the line. It is the Contractor's responsibility to notify any other companies that have underground utilities in the area and arrange for the location of all underground utilities before excavating.
- **1.07.02** The Contractor must cease all work and notify the Railway immediately before continuing excavation in the area if obstructions are encountered which do not appear on drawings. If the obstruction is a utility and the owner of the utility can be identified, then the Contractor must also notify the owner immediately. If there is any doubt about the location of underground cables or lines of any kind, no work must be performed until the exact location has been determined. There will be no exceptions to these instructions.
- **1.07.03** All excavations must be conducted in compliance with applicable OSHA regulations and, regardless of depth, must be shored where there is any danger to tracks, structures or personnel.
- **1.07.04** Any excavations, holes or trenches on the Rail Corridor must be covered, guarded and/or protected when not being worked on. When leaving work site areas at night and over weekends, the areas must be secured and left in a condition that will ensure that Railway employees and other personnel who may be working or passing through the area are protected from all hazards. All excavations must be back filled as soon

as possible.

1.08 Hazardous Waste, Substances and Material Reporting

- **1.08.01** If Contractor discovers any hazardous waste, hazardous substance, petroleum or other deleterious material, including but not limited to any non-containerized commodity or material, on or adjacent to Rail Corridor, in or near any surface water, swamp, wetlands or waterways, while performing any work under this Agreement, Contractor must immediately: (a) notify the Railway's Resource Operations Center at 1(800) 832-5452, of such discovery: (b) take safeguards necessary to protect its employees, subcontractors, agents and/or third parties: and (c) exercise due care with respect to the release, including the taking of any appropriate measure to minimize the impact of such release.

1.09 Personal Injury Reporting

- **1.09.01** The Railway is required to report certain injuries as a part of compliance with Federal Railroad Administration (FRA) reporting requirements. Any personal injury sustained by an employee of the Contractor, subcontractor or Contractor's invitees while on the Rail Corridor must be reported immediately (by phone mail if unable to contact in person) to the Railway's representative in charge of the project. The Non-Employee Personal Injury Data Collection Form contained herein is to be completed and sent by Fax to the Railway at 1(817) 352-7595 and to the Railway's Project Representative no later than the close of shift on the date of the injury.

NON-EMPLOYEE PERSONAL INJURY DATA COLLECTION

INFORMATION REQUIRED TO BE COLLECTED PURSUANT TO FEDERAL REGULATION. IT SHOULD BE USED FOR COMPLIANCE WITH FEDERAL REGULATIONS ONLY AND IS NOT INTENDED TO PRESUME ACCEPTANCE OF RESPONSIBILITY OR LIABILITY.

1. Accident City/St _____ 2. Date: _____ Time: _____
County: _____ 3. Temperature: _____ 4. Weather _____
(if non-Railway location)
5. Social Security # _____
6. Name (last, first, mi) _____
7. Address: Street: _____ City: _____ St. _____ Zip: _____
8. Date of Birth: _____ and/or Age _____ Gender: _____
(if available)
9. (a) Injury: _____ (b) Body Part: _____
(i.e. (a) Laceration (b) Hand)
11. Description of Accident (To include location, action, result, etc.): _____

12. Treatment:
" First Aid Only
" Required Medical Treatment
" Other Medical Treatment

13. Dr. Name _____ 30. Date: _____
14. Dr. Address:
Street: _____ City: _____ St: _____ Zip: _____
15. Hospital Name: _____
16. Hospital Address:
Street: _____ City: _____ St: _____ Zip: _____
17. Diagnosis: _____

**FAX TO
RAILWAY AT (817) 352-7595
AND COPY TO
RAILWAY ROADMASTER FAX 909 386 4843**

OVERPASS EXHIBIT "C-1"

**Agreement
Between
BNSF RAILWAY COMPANY
and the
CONTRACTOR**

BNSF RAILWAY COMPANY
Attention: Manager Public Projects

Railway File: 027207K

Agency Project: Widen the Redlands Loop Overhead and construct a the new Northbound Ramp

Gentlemen:

The undersigned (hereinafter called, the "Contractor"), has entered into a contract (the "Contract") dated _____, 200_, [***Drafter's Note: Insert the date of the contract between the Agency and the Contractor here **] with San Bernardino Associated Governments "SANBAG" for the performance of certain work in connection with the following project: Widen the Redlands Loop Overhead and construct a the new Northbound Ramp. Performance of such work will necessarily require contractor to enter SANBAG'S RAIL CORRIDOR and right of way and property ("Rail Corridor"). The Contract provides that no work will be commenced within The Rail Corridor until the Contractor employed in connection with said work for SANBAG (i) executes and delivers to BNSF Railway Company "Railway" an Agreement in the form hereof, and (ii) provides insurance of the coverage and limits specified in such Agreement and Section 3 herein. If this Agreement is executed by a party who is not the Owner, General Partner, President or Vice President of Contractor, Contractor must furnish evidence to Railway certifying that the signatory is empowered to execute this Agreement on behalf of Contractor.

Accordingly, in consideration of Railway granting permission to Contractor to enter upon The Rail Corridor and as an inducement for such entry, Contractor, effective on the date of the Contract, has agreed and does hereby agree with Railway as follows:

Section 1. RELEASE OF LIABILITY AND INDEMNITY

Contractor hereby waives, releases, indemnifies, defends and holds harmless Railway for all judgments, awards, claims, demands, and expenses (including attorneys' fees), for injury or death to all persons, including Railway's and Contractor's officers and employees, and for loss and damage to property belonging to any person, arising in any manner from Contractor's or any of Contractor's subcontractors' acts or omissions or any work performed on or about Railway's property or right-of-way. **THE LIABILITY ASSUMED BY CONTRACTOR WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DESTRUCTION, DAMAGE, DEATH, OR INJURY WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF RAILWAY, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, EXCEPT TO THE EXTENT THAT SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE WILLFUL MISCONDUCT OR SOLE NEGLIGENCE OF RAILWAY.**

THE INDEMNIFICATION OBLIGATION ASSUMED BY CONTRACTOR INCLUDES ANY CLAIMS, SUITS OR JUDGMENTS BROUGHT AGAINST RAILWAY UNDER THE FEDERAL EMPLOYEE'S LIABILITY ACT, INCLUDING CLAIMS FOR STRICT LIABILITY UNDER THE SAFETY APPLIANCE ACT OR THE BOILER INSPECTION ACT, WHENEVER SO CLAIMED.

Contractor further agrees, at its expense, in the name and on behalf of Railway, that it will adjust and settle all claims made against Railway, and will, at Railway's discretion, appear and defend any suits or actions of law or in equity brought against Railway on any claim or cause of action arising or growing out of or in any manner connected with any liability assumed by Contractor under this Agreement for which Railway is liable or is alleged to be liable. Railway will give notice to Contractor, in writing, of the receipt or dependency of such claims and thereupon Contractor must proceed to adjust and handle to a conclusion such claims, and in the event of a suit being brought against Railway, Railway may forward summons and complaint or other process in connection therewith to Contractor, and Contractor, at Railway's discretion, must defend, adjust, or settle such suits and protect, indemnify, and save harmless Railway from and against all damages, judgments, decrees, attorney's fees, costs, and expenses growing out of or resulting from or incident to any such claims or suits.

It is mutually understood and agreed that the assumption of liabilities and indemnification provided for in this Agreement survive any termination of this Agreement.

Section 2. TERM

This Agreement is effective from the date of the Contract until (i) the completion of the project set forth herein, and (ii) full and complete payment to Railway of any and all sums or other amounts owing and due hereunder.

Section 3. INSURANCE

Contractor must, at its sole cost and expense, procure and maintain during the life of this Agreement the following insurance coverage:

A. **Commercial General Liability insurance.** This insurance must contain broad form contractual liability with a combined single limit of a minimum of \$5,000,000 each occurrence and an aggregate limit of at least \$10,000,000. Coverage must be purchased on a post 1998 ISO occurrence form or equivalent and include coverage for, but not limit to the following:

- ◆ Bodily Injury and Property Damage
- ◆ Personal Injury and Advertising Injury
- ◆ Fire legal liability
- ◆ Products and completed operations

This policy must also contain the following endorsements, which must be indicated on the certificate of insurance:

- ◆ It is agreed that any workers' compensation exclusion does not apply to **Railroad** payments related to the Federal Employers Liability Act or a **Railroad** Wage Continuation Program or similar programs and any payments made are deemed not to be either payments made or obligations assumed under any Workers Compensation, disability benefits, or unemployment compensation law or similar law.
- ◆ The definition of insured contract must be amended to remove any exclusion or other limitation for any work being done within 50 feet of railroad property.
- ◆ Any exclusions related to the explosion, collapse and underground hazards must be removed.

No other endorsements limiting coverage as respects obligations under this Agreement may be included on the policy.

B. **Business Automobile Insurance.** This insurance must contain a combined single limit of at least \$1,000,000 per occurrence, and include coverage for, but not limited to the following:

- ◆ Bodily injury and property damage
- ◆ Any and all vehicles owned, used or hired

C. **Workers Compensation and Employers Liability insurance** including coverage for, but not limited to:

- ◆ _____'s statutory liability under the worker's compensation laws of the state(s) in which the work is to be performed. If optional under State law, the insurance must cover all employees anyway.
- ◆ Employers' Liability (Part B) with limits of at least \$500,000 each accident, \$500,000 by disease policy limit, \$500,000 by disease each employee.

D. Railroad Protective Liability insurance naming only the **Railroad** as the Insured with coverage of at least \$5,000,000 per occurrence and \$10,000,000 in the aggregate. The policy Must be issued on a standard ISO form CG 00 35 10 93 and include the following:

- ◆ Endorsed to include the Pollution Exclusion Amendment (ISO form CG 28 31 10 93)
- ◆ Endorsed to include the Limited Seepage and Pollution Endorsement.
- ◆ Endorsed to remove any exclusion for punitive damages.
- ◆ No other endorsements restricting coverage may be added.
- ◆ The original policy must be provided to the **Railroad** prior to performing any work or services under this Agreement

E. In lieu of providing a Railroad Protective Liability Policy, Agency or its contractors may participate in BNSF's Blanket Railroad Protective Liability Insurance Policy, if available. The limits of coverage are the same as above.

Other Requirements:

All policies (applying to coverage listed above) must not contain an exclusion for punitive damages and certificates of insurance must reflect that no exclusion exists.

Contractor agrees to waive its right of recovery against **Railroad** for all claims and suits against **Railroad**. In addition, its insurers, through the terms of the policy or policy endorsement, waive their right of subrogation against **Railroad** for all claims and suits. The certificate of insurance must reflect the waiver of subrogation endorsement. Contractor further waives its right of recovery, and its insurers also waive their right of subrogation against **Railroad** for loss of its owned or leased property or property under contractor's care, custody or control.

Contractor's insurance policies through policy endorsement, must include wording which states that the policy is primary and non-contributing with respect to any insurance carried by **Railroad**. The certificate of insurance must reflect that the above wording is included in evidenced policies.

All policy(ies) required above (excluding Workers Compensation and if applicable, Railroad Protective) must include a severability of interest endorsement and **Railroad** must be named as an additional insured with respect to work performed under this agreement. Severability of interest and naming **Railroad** as additional insured must be indicated on the certificate of insurance.

Contractor is not allowed to self-insure without the prior written consent of **Railroad**. If granted by **Railroad**, any deductible, self-insured retention or other financial responsibility for claims must be covered directly by contractor in lieu of insurance. Any and all **Railroad** liabilities that would otherwise, in accordance with the provisions of this **Agreement**, be covered by contractor's insurance will be covered as if contractor elected not to include a deductible, self-insured retention or other financial responsibility for claims.

Prior to commencing the Work, contractor must furnish to **Railroad** an acceptable certificate(s) of insurance including an original signature of the authorized representative evidencing the required coverage, endorsements, and amendments and referencing the contract audit/folder number if available. The policy(ies) must contain a provision that obligates the insurance company(ies) issuing such policy(ies) to notify **Railroad** in writing at least 30 days prior to any cancellation, non-renewal, substitution or material alteration. This cancellation provision must be indicated on the certificate of insurance. Upon request from **Railroad**, a certified duplicate original of any required policy must be furnished. Contractor should send the certificate(s) to the following address:

BNSF RISK MANAGEMENT
2500 Lou Menk Drive AOB-1
Fort Worth, TX 76131-2828
Fax: 817-352-7207

Any insurance policy must be written by a reputable insurance company acceptable to *Railroad* or with a current Best's Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the service is to be provide.

Contractor represents that this *Agreement* has been thoroughly reviewed by contractor's insurance agent(s)/broker(s), who have been instructed by contractor to procure the insurance coverage required by this *Agreement*. Allocated Loss Expense must be in addition to all policy limits for coverages referenced above.

Not more frequently than once every five years, *Railroad* may reasonably modify the required insurance coverage to reflect then-current risk management practices in the railroad industry and underwriting practices in the insurance industry.

If any portion of the operation is to be subcontracted by contractor, contractor must require that the subcontractor provide and maintain the insurance coverages set forth herein, naming *Railroad* as an additional insured, and requiring that the subcontractor release, defend and indemnify *Railroad* to the same extent and under the same terms and conditions as contractor is required to release, defend and indemnify *Railroad* herein.

Failure to provide evidence as required by this section will entitle, but not require, *Railroad* to terminate this *Agreement* immediately. Acceptance of a certificate that does not comply with this section will not operate as a waiver of contractor's obligations hereunder.

The fact that insurance (including, without limitation, self-insurance) is obtained by contractor will not be deemed to release or diminish the liability of contractor including, without limitation, liability under the indemnity provisions of this *Agreement*. Damages recoverable by *Railroad* will not be limited by the amount of the required insurance coverage.

For purposes of this section, *Railroad* means "Burlington Northern Santa Fe Corporation", "BNSF RAILWAY COMPANY" and the subsidiaries, successors, assigns and affiliates of each.

In lieu of providing a Railroad Protective Liability Policy, STATE or its contractors may participate in BNSF's Blanket Railroad Protective Liability Insurance Policy, if available. The limits of coverage are the same as above.

Section 4. EXHIBIT "C" CONTRACTOR REQUIREMENTS

The Contractor must observe and comply with the provisions, obligations, requirements and limitations contained in the Contract and the Contractor Requirements set forth on Exhibit "C" attached to the Contract and this Agreement, including, but not be limited to, payment of all costs incurred for any damages to Railway roadbed, tracks, and/or appurtenances thereto, resulting from use, occupancy, or presence of its employees, representatives, or agents or subcontractors on or about the construction site.

Section 5. TRAIN DELAY

Contractor is responsible for and hereby indemnifies and holds harmless Railway (including its affiliated railway companies, and its tenants) for, from and against all damages arising from any unscheduled delay to a freight or passenger train which affects Railway's ability to fully utilize its equipment and to meet customer service and contract obligations. Contractor will be billed, as further provided below, for the economic losses arising from loss of use of equipment, contractual loss of incentive pay and bonuses and contractual penalties resulting from train

delays, whether caused by Contractor, or subcontractors, or by the Railway performing work under this Agreement. Railway agrees that it will not perform any act to unnecessarily cause train delay.

For loss of use of equipment, Contractor will be billed the current freight train hour rate per train as determined from Railway's records. Any disruption to train traffic may cause delays to multiple trains at the same time for the same period.

Additionally, the parties acknowledge that passenger, U.S. mail trains and certain other grain, intermodal, coal and freight trains operate under incentive/penalty contracts between Railway and its customer(s). Under these arrangements, if Railway does not meet its contract service commitments, Railway may suffer loss of performance or incentive pay and/or be subject to penalty payments. Contractor is responsible for any train performance and incentive penalties or other contractual economic losses actually incurred by Railway which are attributable to a train delay caused by Contractor or its subcontractors.

The contractual relationship between Railway and its customers is proprietary and confidential. In the event of a train delay covered by this Agreement, Railway will share information relevant to any train delay to the extent consistent with Railway confidentiality obligations. Damages for train delay for certain trains may be as high as \$50,000.00 per incident.

Contractor and its subcontractors must give Railway's representative (2) two weeks advance notice of the times and dates for proposed work windows. Railway and Contractor will establish mutually agreeable work windows for the project. Railway has the right at any time to revise or change the work windows due to train operations or service obligations. Railway will not be responsible for any additional costs or expenses resulting from a change in work windows. Additional costs or expenses resulting from a change in work windows shall be accounted for in Contractor's expenses for the project.

Contractor and subcontractors must plan, schedule, coordinate and conduct all Contractor's work so as to not cause any delays to any trains.

Kindly acknowledge receipt of this letter by signing and returning to the Railway two original copies of this letter, which, upon execution by Railway, will constitute an Agreement between us.

(Contractor)

BNSF Railway Company

By: _____
Printed Name: _____
Title: _____

By: _____
Name: Melvin Thomas
Manager Public Projects

Contact Person: _____
Address _____

City: _____ State: _____ Zip: _____
Fax: _____
Phone: _____
E-mail: _____

Accepted and effective this _____ day of 20__.

EXHIBIT D

***** MAINTAIN PROPRIETARY CONFIDENTIALITY *****

THE B. N. S. F. RAILWAY COMPANY
FHFM ESTIMATE FOR
SANBAG

LOCATION:- SAN BERNARDINO DETAILS OF ESTIMATE PLAN ITEM: 000126412 VERSION: 1

PURPOSE, JUSTIFICATION AND DESCRIPTION

BNSF TO PROVIDE 100 DAYS @ 10 HRS PER DAY FLAGGING AND 20 DAYS CONTRACT
INSPECTOR/COORDINATOR (\$700/DAY = \$14,000) INSPECTION/COORDINATION IN SUPPORT OF
SANBAG FUNDED FREEWAY WIDENING PROJECT

RFA NO. 59-151-07

AUTHORITY NO. 7-XXXX-07.

DESCRIPTION	QUANTITY	U/M	COST	TOTAL \$
***** LABOR *****				
FLAGGING - BRIDGE - CAP	1000.00	MH	20,911	
PAYROLL ASSOCIATED COSTS			15,315	
EQUIPMENT EXPENSES			5,528	
DA LABOR OVERHEADS			20,977	
INSURANCE EXPENSES			3,293	
TOTAL LABOR COST			66,024	66,024
***** MATERIAL *****				
TOTAL MATERIAL COST			0	0
***** OTHER *****				
CONTRACT INSPECTOR / COORDINATOR	20.00	DAY	14,000	
TOTAL OTHER ITEMS COST			14,000	14,000
PROJECT SUBTOTAL				80,024
CONTINGENCIES				8,002
BILL PREPARATION FEE				441
GROSS PROJECT COST				88,467
LESS COST PAID BY BNSF				0
TOTAL BILLABLE COST				88,467

Exhibit E



Melvin Thomas	BNSF Railway Company
<i>Manager Public Projects</i>	740 East Carnegie Drive
<i>Engineering Services</i>	San Bernardino, CA 92408
	Office: 909-386-4472
	Fax: 909-386-4479
	Cell: 909-754-5745
	Email: melvin.thomas@bnsf.com

Date:

Darren Kettle
Director of Freeway Construction
San Bernardino Associated Governments
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410

Re: Final Approval of Plans and Specifications dated _____
by (consultant) (hereinafter called, the "Plans
and Specifications") _____

Dear Mr. Kettle:

This letter serves as BNSF RAILWAY COMPANY'S ("BNSF") final written approval of the Plans and Specifications covering the widening of the Redlands Loop Overhead and the construction of a new Northbound Ramp, US DOT No. 027207K. This final written approval is given to SAN BERNARDINO ASSOCIATED GOVERNMENTS ("SANBAG") pursuant to Article III, Section 1 of that certain Overhead Agreement between BNSF, SANBAG, and the STATE of CALIFORNIA dated _____. If the Plans and Specifications are revised by SANBAG subsequent to the date set forth above, this letter shall no longer serve as final written approval of the Plans and Specifications and SANBAG must resubmit said Plans and Specifications to BNSF for final written approval.

Respectfully,

Melvin Thomas

Manager Public Projects
BNSF Railway

Exhibit F

BNSF Bridge Requirements Redlands Loop Overhead

BRIDGE DESIGN, PLANS & SPECIFICATIONS:

Except for the design of temporary falsework and shoring, BNSF review of the Structure plans will be limited to the vertical and horizontal clearances, sight distance for existing train signals, foundation dimensions and drainage characteristics as they relate to existing and future tracks. BNSF will not review structural design calculations for the permanent Structure unless a member or members are influenced by railroad live loads.

Temporary falsework and shoring plans and calculations must be reviewed and approved by BNSF prior to beginning construction. SANBAG shall perform an independent review of the design calculations for temporary falsework and shoring prior to submitting them to BNSF for approval. Temporary construction clearances must be no less than 10 feet measured horizontally from the centerline of the nearest track and 21 feet-6 inches measured vertically from the top of rail of the most elevated track to the bottom of lowest temporary falsework member. State regulatory agencies may have more restrictive requirements for temporary railroad clearances.

For the permanent Structure, SANBAG will submit plans showing the least horizontal distance from the centerline of existing and future tracks to the face of the nearest member of the proposed Structure. The location of the least horizontal distance must be accurately described such that BNSF can determine where it will occur in both the horizontal and vertical plane. If the permanent member is within 25 feet of the nearest track (or future track), collision walls shall be incorporated into the permanent Structure design according to American Railway Engineering and Maintenance Association Manual of Recommended Practice - Chapter 8 - Article 2.1.5.

For the permanent Structure, SANBAG will submit plans showing the least vertical clearance from top of the most elevated rail of existing and future tracks to the lowest point of the proposed Structure. Prior to beginning construction of the permanent Structure, the top of rail elevations should be checked and verified that they have not changed from the assumed elevations utilized for the design of the bridge.

Prior to issuing any invitation to bid on construction of the Structure, SANBAG should conduct a pre-bid meeting where prospective Contractors have the opportunity to communicate with BNSF personnel regarding site specific train speeds, train density, and general safety requirements for men and equipment working near live tracks. Any invitation to bid and specifications for the Structure must be submitted to BNSF for review and approval prior to letting of bids for the Project.

BRIDGE CONSTRUCTION:

After awarding the bid, but prior to the Contractor entering SANBAG'S Rail Corridor or property, SANBAG should conduct a pre-construction meeting with BNSF personnel in attendance to reiterate the safety requirements of construction activity adjacent to live tracks.

During construction, BNSF may require an independent engineering inspector to be present during certain critical activities of the Project, including but not limited to: driving foundation piles, erecting falsework, construction of shoring and retaining walls, placing concrete, placing soil backfill and compaction processes. SANBAG shall reimburse BNSF for all costs of supplemental inspection services.

BRIDGE MAINTENANCE:

STATE will be responsible for maintenance and repair of the Structure including the earth retention components, embankment slopes, erosion control, surface drainage, fencing, deck drains, landscaping, paint, walkways, handrails, lighting, and other improvements associated with the Project.

Fencing and other pedestrian access controls within SANBAG'S Rail Corridor and incorporated into the Project shall be designed and maintained by SANBAG. Trespasser control shall be the responsibility of SANBAG. STATE will arrange for removal of graffiti from the Structure.

BRIDGE INSPECTION:

STATE will conduct annual routine structural inspections. In the event of an earthquake, fire, flood, damage from vehicular impacts or other emergent situations, STATE will provide an immediate inspection by qualified personnel and notify SANBAG and BNSF of damage that may affect safe passage of trains. If necessary STATE will embargo weights or provide lane closures or other such measures to protect the structural integrity of the Structure such that there can be continuous safe passage of trains until repairs are made.

BRIDGE ALTERATIONS:

Except as provided otherwise by this Agreement, there will be no alterations made to the Structure that will alter the railroad vertical or horizontal clearances provided by the original design

It is expressly understood by STATE that the right to install utilities is restricted to the placement of underground utilities beneath SANBAG'S tracks located a minimum of fifty (50) feet from abutments, piers, piles, or footings. Under no circumstances will utilities be allowed to hang from the Structure, unless approved by SANBAG. All utility crossings within the limits of SANBAG'S Rail Corridor will be covered by separate agreements between SANBAG and each of the owners of the utilities.

OVERHEAD AGREEMENT

BNSF File No. 026113F
Ninth Street Overhead
U.S. D.O.T. No. 26113F

This Agreement ("**Agreement**"), is executed to be effective as of this 9th day of March, 2008 ("**Effective Date**"), by and between BNSF RAILWAY COMPANY, a Delaware corporation ("**BNSF**"), and the STATE OF CALIFORNIA, acting through the Department of Transportation, hereinafter referred to as ("**STATE**") and the **SAN BERNARDINO ASSOCIATED GOVERNMENTS**, a body corporate and politic of the State of California, hereinafter referred to as ("**SANBAG**").

RECITALS:

WHEREAS, BNSF owns and operates a line of railroad in and through the City of San Bernardino, County of San Bernardino, State of California;

WHEREAS, STATE and The Atchison, Topeka and Santa Fe Railway Company, predecessor in interest to BNSF, hereinafter referred to as ("**Santa Fe**"), entered into an agreement dated February 27, 1958, carried in BNSF's records as Contract No. CL-61878, ("**Original Agreement**") which provided for the construction and maintenance of five (5) grade separation structures comprising of Ninth Street, Baseline Street, 16th Street, Massachusetts Avenue, and 27th Street Overheads, over and across BNSF's rail corridor hereinafter referred to as ("**Rail Corridor**"), and over its tracks;

WHEREAS, this Agreement covers the demolition and reconstruction of the Ninth Street Overhead only;

WHEREAS, STATE and the San Bernardino Associated Governments hereinafter referred to as "SANBAG", propose to reconstruct Interstate Highway I-215, through the City of San Bernardino, in order to accommodate the construction of High Occupancy Vehicle (HOV) lanes involving the demolition and reconstruction of the Ninth Street Overhead by means of a 362.02 foot long 3-span cast in place prestressed concrete box girder on concrete columns and concrete abutments;

WHEREAS, STATE and SANBAG have entered into a Design Cooperative Agreement, dated September 3, 2008 providing for SANBAG's design for the reconstruction of the Segment 2 portion of the Interstate Highway I-215 reconstruction project, which includes the reconstruction of the Ninth Street Overhead.

WHEREAS, STATE and SANBAG will enter into a Construction Cooperative Agreement prior to the start of construction of the Project as described in Article I, Section 1 of this Agreement, that will provide for SANBAG's construction of the **Project** with STATE owning and maintaining the **Structure** as described in Article I, Section 1.

NOW, THEREFORE, in consideration of the mutual covenants and agreements of the parties contained herein, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

ARTICLE I – SCOPE OF WORK

1. The term "**Project**" as used herein includes any and all work related to the removal of the existing Ninth Street Overhead and the construction of a replacement Ninth Street Overhead, (hereinafter referred to as the "**Structure**"), more particularly described on the Exhibit A attached hereto and incorporated herein, including, but not limited to, any and all changes to telephone, telegraph, signal and electrical lines and appurtenances, temporary and permanent track work, fencing, grading, alterations to or new construction of drainage facilities, preliminary and construction engineering and contract preparation.

ARTICLE II – BNSF OBLIGATIONS

In consideration of the covenants of STATE and SANBAG set forth herein and the faithful performance thereof, BNSF agrees as follows:

1. Upon STATE's payment to BNSF of the sum of Four Thousand Four Hundred Sixty Eight and No/100 DOLLARS (\$4,468.00), BNSF shall grant to SANBAG, its successors and assigns, upon and subject to the terms and conditions set forth in this Agreement, a temporary non-exclusive license (hereinafter called, "Temporary Construction License") to construct the Structure across or upon the portion of BNSF's Rail Corridor described further on Exhibit A, excepting and reserving BNSF's rights, and the rights of any others who have obtained, or may obtain, permission or authority from BNSF, to do the following:

- (a) Operate, maintain, renew and/or relocate any and all existing railroad track or tracks, wires, pipelines and other facilities of like character upon, over or under the surface of said rail corridor;
- (b) Construct, operate, maintain, renew and/or relocate upon said rail corridor, without limitation, such facilities as the BNSF may from time to time deem appropriate, provided such facilities do not materially interfere with SANBAG'S construction of the Structure;
- (c) Use or operate the Rail Corridor as BNSF may from time to time deem appropriate, provided such use or operations does not materially interfere with STATE's use of the Structure.

The Temporary Construction License shall be in the form attached hereto as Exhibit B and by this reference made a part hereof, and shall be for a term beginning on the authorized commencement date as set forth hereinafter in Article III, Section 10 (c) ("Effective Date") and ending on the earlier of (i) completion of the Structure, or (ii) Twenty Four (24) months following the Effective Date of the Temporary Construction License. The Temporary Construction License and related rights to be given by BNSF to SANBAG shall be without warranty of title of any kind, express or implied, and no covenant of warranty of title will be implied from the use of any word or words therein contained. The Temporary Construction License shall be for the Project and for no other purpose. SANBAG acknowledges and agrees that SANBAG shall not have the right, under the Temporary Construction License, to use the Structure. In the event STATE or SANBAG is evicted by anyone owning, or claiming title to or any interest in said Rail Corridor, BNSF will not be liable to STATE or SANBAG for any damages, losses or any expenses of any nature whatsoever. The granting of similar rights to others, subsequent to the date of this Agreement, will not impair or interfere with the rights granted to SANBAG pursuant to the Temporary Construction License.

Upon payment to BNSF of the additional sum of Twenty Two Thousand Nine Hundred and Sixty Nine and No/100 DOLLARS (\$22,969.00), such payment to be made within thirty (30) days of the giving of the notice required pursuant to Article III, Section 13 of this Agreement, BNSF shall deliver to STATE, its successors and assigns, a perpetual easement to enter upon and use that portion of BNSF's Rail Corridor described therein as is necessary to use and maintain the Structure. The Easement shall be in the form attached hereto as Exhibit B-1 and by this reference made a part hereof.

2. BNSF will furnish all labor, materials, tools, and equipment for railroad work required for the construction of the Project, such railroad work and the estimated cost thereof being as shown on Exhibit D attached hereto and made a part hereof. In the event construction on the Project has not commenced within six (6) months following the Effective Date, BNSF may, in its sole and absolute discretion, revise the cost estimates set forth in said Exhibit D. In such event, the revised cost estimates will become a part of this Agreement as though originally set forth herein. Any item of work incidental to the items listed on Exhibit D not specifically mentioned therein may be included as a part of this Agreement upon written approval of SANBAG, which approval will not be unreasonably withheld. Construction of the Project will include the following principle elements of railroad work by BNSF:

- (a) Procurement of materials, equipment and supplies necessary for the railroad work;
- (b) Preliminary engineering, design, and contract preparation;

- (c) Furnishing of flagging services necessary for the safety of BNSF's property and the operation of its trains during construction of the Project as set forth in further detail on Exhibit C, attached to this Agreement and made a part hereof;
 - (d) Furnishing engineering and inspection as required in connection with the construction of the Project and;
 - (e) Providing a contract project coordinator, at SANBAG's expense, to serve as a project manager for the Project;
3. BNSF will do all railroad work set forth in Article II, Section 2 above on an actual cost basis, when BNSF, in its sole discretion, determines it is required by its labor agreements to perform such work with its own employees working under applicable collective bargaining agreements or by contractor(s) if necessary.
4. SANBAG agrees to reimburse BNSF for work of an emergency nature caused by SANBAG or SANBAG's contractor in connection with the Project which is reasonably necessary for the immediate restoration of railroad operations, or for the protection of persons or BNSF property. Such work may be performed by BNSF without prior approval of SANBAG and SANBAG agrees to fully reimburse BNSF for all such emergency work.
5. BNSF may charge SANBAG for insurance expenses, including self-insurance expenses, when such expenses cover the cost of Employer's Liability (including, without limitation, liability under the Federal Employer's Liability Act) in connection with the construction of the Project. Such charges will be considered part of the actual cost of the Project, regardless of the nature or amount of ultimate liability for injury, loss or death to BNSF's employees, if any.
6. During the construction of the Project, BNSF will send SANBAG progressive invoices detailing the costs of the railroad work performed by BNSF under this Agreement. Pursuant to the California Prompt Payment Act, CALIFORNIA CODES, GOVERNMENT CODE, SECTION 927-927.12, SANBAG must reimburse BNSF for completed force-account work within forty-five (45) calendar days from the date of SANBAG's receipt of the invoice for such work. Upon completion of the Project, BNSF will send SANBAG a detailed invoice of final costs, segregated as to labor and materials for each item in the recapitulation shown on Exhibit D. If SANBAG fails to make payment of a BNSF invoice within said forty-five (45) days, SANBAG shall pay a penalty at a rate of 1 percent above the rate accrued on June 30 of the prior year by the Pooled Money Investment Account, not to exceed a rate of 15 percent pursuant to Section 927.6 (b) of said Government Code.

ARTICLE III – SANBAG OBLIGATIONS

In consideration of the covenants of STATE and BNSF set forth herein and the faithful performance thereof, SANBAG agrees as follows:

1. SANBAG shall furnish to BNSF and STATE plans and specifications for the Project together with calculations with the railroad clearances expressed in **English Units**. One complete reduced size 11" x 17" paper copy shall be submitted to BNSF's Director of Structural Engineering. A PDF copy of the plans and specifications should be sent to both BNSF'S Manager Public Projects and BNSF'S Director Structural Engineering. The PDF copy with a file size of two (2) megabytes or less should be sent via an email attachment. Should the PDF copy of the plans and specifications exceed two (2) megabytes, a CD (Compact Disk) of the plans and specifications should be sent via overnight mail service to both BNSF offices. The email and mailing addresses are included in Article V, Section 23. Sets of said plans shall be submitted to BNSF and STATE for approval prior to commencement of any construction. BNSF will give SANBAG final written approval of the plans and specifications substantially in the form of Exhibit E, attached to this Agreement and made a part hereof. Upon BNSF'S final written approval of the plans and specifications, said plans and specifications will become part of this Agreement and are hereby incorporated herein. Any approval of the plans and specifications by BNSF shall in no way obligate BNSF in any manner with respect to the finished product design and/or construction. Any approval by BNSF shall mean only that the plans and specifications meet BNSF standard specifications, and such

approval by BNSF shall not be deemed to mean that the plans and specifications or construction is structurally sound and appropriate or that such plans and specifications meet applicable regulations, laws, statutes or local ordinances and/or building codes.

2. SANBAG must provide for and maintain minimum vertical and horizontal clearances, as required and approved by BNSF as part of the plans and specifications for the Project.

3. SANBAG must make any and all arrangements for the installation or relocation of wire lines, pipe lines and other facilities owned by private persons, companies, corporations, political subdivisions or public utilities other than BNSF which may be necessary for the construction of the Project.

4. SANBAG must construct the Project as shown on the attached Exhibit A and do all work ("**SANBAG's Work**") provided for in the plans and specifications for the Project, except railroad work that will be performed by BNSF herein. SANBAG must furnish all labor, materials, tools and equipment for the performance of SANBAG's Work. The principal elements of SANBAG's Work are as follows:

- (a) Preliminary and final Engineering;
- (b) Demolition and removal of the existing Ninth Street Overhead;
- (c) Design and the Construction of the Structure;
- (d) All necessary grading and paving, including backfill of excavations and restoration of disturbed vegetation on BNSF's Rail Corridor;
- (e) Provide suitable drainage, both temporary and permanent;
- (f) Apply the D.O.T. Crossing Number 026113F in a conspicuous location on the Structure.
- (g) Job site cleanup including removal of all construction materials, concrete debris, surplus soil, refuse, contaminated soils, asphalt debris, litter and other waste materials to the satisfaction of BNSF;

5. SANBAG's Work must be performed by SANBAG or SANBAG's contractor in a manner that will not endanger or interfere with the safe and timely operations of BNSF and its facilities.

6. SANBAG must require its contractor(s) to notify BNSF's Roadmaster at least thirty (30) calendar days prior to requesting a BNSF flagman in accordance with the requirements of Exhibit C attached hereto. Additionally, SANBAG must require its contractor(s) to notify BNSF's Manager of Public Projects thirty (30) calendar days prior to commencing work on BNSF property or near BNSF tracks.

7. SANBAG or its contractor(s) shall submit one reduced size 11" x 17" paper copy, including calculations, expressed in **English Units** of the plans and specifications for proposed shoring, falsework, or cribbing to be used over, under, or adjacent to BNSF'S tracks to BNSF'S Director Structural Engineering. SANBAG or its contractor(s) shall submit a PDF copy of the plans and specifications for the proposed shoring, falsework, or cribbing to both BNSF'S Manager Public Projects and BNSF'S Director Structural Engineering. The PDF copy with a file size of two (2) megabytes or less should be sent via an email attachment. Should the PDF copy of the plans and specifications exceed two (2) megabytes, a CD (Compact Disk) of the plans and specifications should be sent via overnight mail service to both BNSF offices for approval. The email and mailing addresses are included in Article V, Section 23. The shoring, falsework or cribbing used by SANBAG'S contractor shall comply with the BNSF Bridge Requirements set forth on Exhibit F, and BNSF's Instructions FOR PREPARATION OF DEMOLITION PLANS as set forth in Exhibit G with both Exhibits attached to this Agreement and incorporated herein, and all applicable requirements promulgated by state and federal agencies, departments, commissions and other legislative bodies.

Falsework shall be designed according to the State of California, Department of Transportation FALSEWORK MANUAL available at this Web Site:

[http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCompleteManuals/FalseworkManual\(Rev32\).pdf](http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCompleteManuals/FalseworkManual(Rev32).pdf).

8. SANBAG must include the following provisions in any contract with its contractor(s) performing work on said Project:

- (a) The Contractor is placed on notice that fiber optic, communication and other cable lines and systems (collectively, the "Lines") owned by various telecommunications companies may be buried on BNSF's property or Rail Corridor. The locations of these Lines have been included on the plans based on information from the telecommunications companies. The contractor will be responsible for contacting BNSF's Project Engineer at telephone number 909 386 4079 and/or the telecommunications companies and notifying them of any work that may damage these Lines or facilities and/or interfere with their service. The contractor must also mark all Lines shown on the plans or marked in the field in order to verify their locations. The contractor must also use all reasonable methods when working in the BNSF Rail Corridor or on BNSF property to determine if any other Lines (fiber optic, cable, communication or otherwise) may exist.
- (b) Failure to mark or identify these Lines will be sufficient cause for any BNSF Representative to stop construction at no cost to SANBAG or BNSF until these items are completed.
- (c) In addition to the liability terms contained elsewhere in this Agreement, the contractor hereby indemnifies, defends and holds harmless BNSF for, from and against all cost, liability, and expense whatsoever (including, without limitation, attorney's fees and court costs and expenses) arising out of or in any way contributed to by any act or omission of Contractor, its subcontractors, agents and/or employees that cause or in any way or degree contribute to (1) any damage to or destruction of any Lines by Contractor, and/or its subcontractors, agents and/or employees, on BNSF's property or within BNSF's Rail Corridor, (2) any injury to or death of any person employed by or on behalf of any telecommunications company, and/or its contractor, agents and/or employees, on BNSF's property or within BNSF's Rail Corridor, and/or (3) any claim or cause of action for alleged loss of profits or revenue by, or loss of service by a customer or user of such telecommunication company(ies). **THE LIABILITY ASSUMED BY CONTRACTOR WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DAMAGE, DESTRUCTION, INJURY, DEATH, CAUSE OF ACTION OR CLAIM WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF BNSF, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, UNLESS SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE WILLFUL MISCONDUCT OR SOLE NEGLIGENCE OF BNSF.**
- (d) The Contractor will be responsible for the rearrangement of any facilities or Lines determined to interfere with the construction. The Contractor must cooperate fully with any telecommunications company(ies) in performing such rearrangements.

9. SANBAG must incorporate in each prime contract for construction of the Project, or the specifications therefore (i) the provisions set forth in Article III, Sections 5, 6, 7, 8, and 10; (ii) the provisions set forth in Article V, Sections 1, 2, 3, 4, 5, 6, 7, 11 and 12; and (iii) the provisions set forth in Exhibit C, Exhibit C-I, Exhibit F and Exhibit G, with the herein referenced Exhibits attached hereto and by reference made a part hereof.

10. Except as otherwise provided below in this Section 10, all construction work performed hereunder by SANBAG for the Project will be pursuant to a contract or contracts to be let by SANBAG, and all such contracts must include the following:

- (a) All work performed under such contract or contracts within the limits of BNSF's Rail Corridor must be performed in a good and workmanlike manner in accordance with plans and specifications approved by BNSF;

- (b) Changes or modifications during construction that affect safety or BNSF operations must be subject to BNSF's approval;
- (c) No work will be commenced within BNSF's Rail Corridor until each of the prime contractors employed in connection with said work must have (i) executed and delivered to BNSF a letter agreement in the form of Exhibit C-1, and (ii) delivered to and secured BNSF's approval of the required insurance; and
- (d) If it is in SANBAG's best interest, SANBAG may direct that the construction of the Project be done by day labor under the direction and control of SANBAG, or if at any time, in the opinion of SANBAG, the contractor has failed to prosecute with diligence the work specified in and by the terms of said contract, SANBAG may terminate its contract with the contractor and take control over the work and proceed to complete the same by day labor or by employing another contractor(s) provided; however, that any contractor(s) replacing the original contractor(s) must comply with the obligations in favor of BNSF set forth above and, provided further, that if such construction is performed by day labor, SANBAG will, at its expense, procure and maintain on behalf of BNSF the insurance required by Exhibit C-1.
- (e) To facilitate scheduling for the Project, SANBAG shall have its contractor give BNSF's Project Engineer at telephone number 909 386 4079 eight (8) weeks advance notice of the proposed times and dates for work windows. BNSF and SANBAG's contractor will establish mutually agreeable work windows for the Project. SANBAG shall inform its contractor that any request for work windows with less than eight (8) weeks advance notice will have a reduced probability of approval. BNSF has the right at any time to revise or change the work windows, due to train operations or service obligations. BNSF will not be responsible for any additional costs and expenses resulting from a change in work windows. Additional costs and expenses resulting from a change in work windows shall be accounted for in the contractor's expenses for the Project.
- (f) The plans and specifications for the Project must be in compliance with the Bridge Requirements set forth in Exhibit F and the INSTRUCTIONS FOR PREPARATION OF DEMOLITION PLANS set forth in Exhibit G, with both Exhibits attached to this Agreement and incorporated herein.

11. SANBAG must advise the BNSF Manager of Public Projects, in writing, of the completion date of the Project within thirty (30) days after such completion date. Additionally, SANBAG must notify BNSF's Manager of Public Projects, in writing, of the date on which SANBAG, and/or STATE and/or SANBAG's Contractor will meet with BNSF for the purpose of making final inspection of the Project.

12. **TO THE FULLEST EXTENT PERMITTED BY LAW, SANBAG HEREBY RELEASES, INDEMNIFIES, DEFENDS AND HOLDS HARMLESS BNSF, ITS AFFILIATED COMPANIES, PARTNERS, SUCCESSORS, ASSIGNS, LEGAL REPRESENTATIVES, OFFICERS, DIRECTORS, SHAREHOLDERS, EMPLOYEES AND AGENTS FOR, FROM AND AGAINST ANY AND ALL CLAIMS, LIABILITIES, FINES, PENALTIES, COSTS, DAMAGES, LOSSES, LIENS, CAUSES OF ACTION, SUITS, DEMANDS, JUDGMENTS AND EXPENSES (INCLUDING, WITHOUT LIMITATION, COURT COSTS AND ATTORNEYS' FEES) OF ANY NATURE, KIND OR DESCRIPTION OF ANY PERSON (INCLUDING, WITHOUT LIMITATION, THE EMPLOYEES OF THE PARTIES HERETO) OR ENTITY DIRECTLY OR INDIRECTLY ARISING OUT OF, RESULTING FROM OR RELATED TO (IN WHOLE OR IN PART) (I) THE USE, OCCUPANCY OR PRESENCE OF SANBAG, ITS CONTRACTORS, SUBCONTRACTORS, EMPLOYEES OR AGENTS IN, ON, OR ABOUT THE CONSTRUCTION SITE, (II) THE PERFORMANCE, OR FAILURE TO PERFORM BY SANBAG, ITS CONTRACTORS, SUBCONTRACTORS, EMPLOYEES, OR AGENTS, ITS WORK OR ANY OBLIGATION UNDER THIS AGREEMENT, (III) THE SOLE OR CONTRIBUTING ACTS OR OMISSIONS OF SANBAG, ITS CONTRACTORS, SUBCONTRACTORS, EMPLOYEES, OR AGENTS IN, ON, OR ABOUT THE CONSTRUCTION SITE, (IV) SANBAG'S BREACH OF THE TEMPORARY CONSTRUCTION LICENSE GRANTED TO SANBAG PURSUANT TO ARTICLE II OF THIS AGREEMENT, (V) ANY RIGHTS OR INTERESTS GRANTED TO SANBAG PURSUANT TO THE TEMPORARY CONSTRUCTION LICENSE DISCUSSED IN ARTICLE II OF THIS AGREEMENT, (VI) SANBAG'S OCCUPATION AND USE OF**

BNSF'S PROPERTY OR RAIL CORRIDOR, OR (VII) AN ACT OR OMISSION OF SANBAG OR ITS OFFICERS, AGENTS, INVITEES, EMPLOYEES OR CONTRACTORS OR ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM, OR ANYONE THEY CONTROL OR EXERCISE CONTROL OVER. THE LIABILITY ASSUMED BY SANBAG WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DAMAGE, DESTRUCTION, INJURY OR DEATH WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF BNSF, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, UNLESS SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE WILLFUL MISCONDUCT OR SOLE NEGLIGENCE OF BNSF.

13. SANBAG must give BNSF's Manager of Public Projects written notice to proceed ("**Notice to Proceed**") with the railroad work after receipt of necessary funds for the Project. BNSF will not begin the railroad work (including, without limitation, procurement of supplies, equipment or materials) until written notice to proceed is received from SANBAG. The Notice to Proceed must reference BNSF's file number 026113F.

ARTICLE IV - STATE OBLIGATIONS

IN CONSIDERATION of the covenants of BNSF and SANBAG herein contained and the faithful performance thereof, STATE agrees:

1. To permit SANBAG to act as the responsible lead agency to design and construct the Project.
2. STATE must make application to the Public Utilities Commission of the State of California ("**Commission**") for an order authorizing construction of the Project and to furnish to the Commission plans of the proposed construction, approved by BNSF, together with a copy of this agreement and to obtain all other required permits and approvals for the construction of the Project.
3. STATE will acquire all properties required to construct the Project and maintain the Structure;
4. In addition to the terms and conditions set forth elsewhere in this Agreement, including, but not limited to, the terms and conditions stated in Exhibit F, BNSF and STATE agree to the following terms upon completion of construction of the Project:
 - (a) STATE will own and maintain, at its sole cost and expense, the Structure, the highway approaches, and appurtenances thereto, lighting, drainage and any access roadways to BNSF gates installed pursuant to this Agreement.
 - (b) STATE will arrange for removal of graffiti from the Structure;
 - (c) STATE must maintain D.O.T. Crossing Number 026113F in legible condition in the conspicuous location on the Structure where applied by SANBAG during construction;
 - (d) It is understood by STATE that the right to install utilities is restricted to the placement of underground utilities beneath BNSF's tracks located a minimum of fifty (50) feet from abutments, piers, piles, or footings with the exception that upon BNSF's prior approval BNSF will permit selected utilities to be run through the deck of the Structure. Under no circumstances will utilities be allowed to hang from the Structure. All utility crossings within the limits of BNSF's Rail Corridor will be covered by separate agreements between BNSF and each of the owners of the utilities.
 - (e) Upon request from BNSF, STATE shall remove all trash and debris associated with the Structure from BNSF's property.
 - (f) In conformance with and limited to the applicable effect of California Laws insofar as the indemnity and insurance provisions set forth in any of the preceding sections or any rider, amendment or addendum hereto, State is self-insured. If State performs (i) alterations or modifications to the Structure, or (ii) any maintenance or other work on the Structure with heavy tools, equipment or machinery at ground surface level horizontally within 25'-0" of

the centerline of the nearest track, or (iii) any maintenance or other work outside the limits of the deck of the Structure vertically above the top of the rail, then STATE, shall provide BNSF defense and indemnification at least equal to the defense, indemnification and insurance provisions contained in Exhibit C-1 in accordance with California Government Code section 14662.5. Nothing herein shall be deemed to insure BNSF against its sole negligence or willful misconduct.

In the event any of the Work to be done on behalf of STATE upon BNSF's Rail Corridor is to be done by a contractor or subcontractor, said contractor or subcontractor shall provide to BNSF the insurance policies, certificates, binders, and/or endorsements in favor of BNSF as contained in said Exhibit C-1 as the same may be revised from time to time.

5. Subject to the restrictions imposed by Article V, Section 11 below, STATE must notify and obtain prior authorization from BNSF's Manager of Public Projects before entering BNSF's Rail Corridor for maintenance purposes. If the construction work hereunder is contracted, STATE must require its prime contractor(s) to comply with the obligations set forth in Exhibit C, Exhibit C-1 and Exhibit F, as the same may be revised from time to time. STATE will be responsible for its contractor(s) compliance with such obligations.

6. PURSUANT TO CALIFORNIA GOVERNMENT CODE SECTION 14662.5, STATE HEREBY AGREES TO INDEMNIFY AND HOLD HARMLESS BNSF FROM, AND TO REPAIR OR PAY FOR, ANY DAMAGE PROXIMATELY CAUSED BY REASON OF THE USES AUTHORIZED BY THE EASEMENT SET FORTH IN EXHIBIT B-1 TO THIS AGREEMENT.

ARTICLE V – JOINT OBLIGATIONS

IN CONSIDERATION of the premises, the parties hereto mutually agree to the following:

1. All work contemplated in this Agreement must be performed in a good and workmanlike manner and each portion must be promptly commenced by the party obligated hereunder to perform the same and thereafter diligently prosecuted to conclusion in its logical order and sequence. Furthermore, any changes or modifications during construction which affect BNSF will be subject to BNSF's approval prior to the commencement of any such changes or modifications.

2. The work hereunder must be done in accordance with the Bridge Requirements set forth on Exhibit F, the Instructions For Preparation Of Demolition Plans as set forth in Exhibit G, and the detailed plans and specifications approved by BNSF.

3. SANBAG must require its contractor(s) to reasonably adhere to the Project's construction schedule for all Project work. The parties hereto mutually agree that BNSF's failure to complete the railroad work in accordance with the construction schedule due to inclement weather or unforeseen railroad emergencies will not constitute a breach of this Agreement by BNSF and will not subject BNSF to any liability. Regardless of the requirements of the construction schedule, BNSF reserves the right to reallocate the labor forces assigned to complete the railroad work in the event of an emergency to provide for the immediate restoration of railroad operations (BNSF or its related railroads) or to protect persons or property on or near any BNSF owned property. BNSF will not be liable for any additional costs or expenses resulting from any such reallocation of its labor forces. The parties mutually agree that any reallocation of labor forces by BNSF pursuant to this provision and any direct or indirect consequences or costs resulting from any such reallocation will not constitute a breach of this Agreement by BNSF.

4. BNSF shall have the right to request any SANBAG employee, or STATE employee, who enters BNSF's Rail Corridor and because of their incompetence, neglect of duty, unsafe conduct or misconduct and/or they adversely affected BNSF's operations or facilities, be removed from the Rail Corridor. In the event SANBAG, or STATE elects not to honor such request, BNSF may stop work within its Rail Corridor until the matter has been fully resolved to BNSF's satisfaction. The party whose employee has been asked to leave the Rail Corridor will indemnify BNSF and the other parties against any claims arising from such removal.

5. BNSF: will have the right to stop construction work on the Project if any of the following events take place: (i) Contractor (or any of its subcontractors) performs the Project work in a manner contrary to the plans and specifications approved by BNSF; (ii) Contractor (or any of its subcontractors), in BNSF's opinion, prosecutes the Project work in a manner which is hazardous to BNSF property, facilities or the safe and expeditious movement of railroad traffic; (iii) the insurance described in the attached Exhibit C-1 is canceled during the course of the Project; or (iv) STATE fails to pay BNSF for the Easement pursuant to Article II, Section 1 of this Agreement. The work stoppage will continue until all necessary actions are taken by STATE, Contractor or its subcontractor to rectify the situation to the satisfaction of BNSF's Division Engineer or until additional insurance has been delivered to and accepted by BNSF. In the event of a breach of (i) this Agreement, (ii) the Temporary Construction License, or (iii) the Easement, BNSF may immediately terminate the Temporary Construction License or the Easement. Any such work stoppage under this provision will not give rise to any liability on the part of BNSF. BNSF's right to stop the work is in addition to any other rights BNSF may have including, but not limited to, actions or suits for damages or lost profits. In the event that BNSF desires to stop construction work on the Project, BNSF agrees to immediately notify the following individual in writing:

SANBAG Director of Freeway Construction
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410
Fax: (909) 388-2002.

6. SANBAG's or any STATE employee, agents, contractors, representatives and invitees shall wear Personal Protective Equipment ("PPE") when on the BNSF's Rail Corridor during construction of the Project or performing subsequent maintenance after completion of construction. The PPE shall meet applicable OSHA and ANSI specifications. Current BNSF PPE requirements are listed on the web site, www.contractororientation.com. A partial list of BNSF's PPE requirements include; a) safety glasses: permanently affixed side shields; no yellow lenses, b) hard hats with high visibility orange cover, c) safety shoes: hardened toe, above-the-ankle lace-up with a defined heel and d), high visibility retro-reflective orange vests are required as specified by BNSF's representative in charge of the Project. PPE requirements as defined on the web site, will be amended from time to time, and shall take precedence over the Partial list of requirements outlined in this Section 6 of Article V. Hearing protection, fall protection and respirators will be worn as required by State and Federal regulations.

7. SANBAG must supervise and inspect the operations of all SANBAG contractors to assure compliance with the plans and specifications approved by BNSF, the terms of this Agreement and all safety requirements of the BNSF railroad. If BNSF determines that proper supervision and inspection is not being performed by SANBAG personnel at any time during construction of the Project, BNSF has the right to stop construction (within or adjacent to its operating Rail Corridor). Construction of the Project will not proceed until SANBAG corrects the situation to BNSF's reasonable satisfaction. If BNSF feels the situation is not being corrected in an expeditious manner, BNSF will immediately notify SANBAG Director of Freeway Construction for appropriate corrective action.

8. The Project funding is contemplated to come from mixed sources including Federal funds. Pursuant FEDERAL-AID POLICY GUIDE, dated December 9, 1991, Transmittal 1 23 CFR 646B which states projects for the reconstruction of existing grade separations are deemed to generally be of no ascertainable net benefit to the railroad and there shall be no required railroad share of the costs. Additionally pursuant to the California Public Utilities Code 1201.5 (d) BNSF is not required to contribute to the cost to reconstruct the Ninth Street Overhead as its reconstruction will not increase its capacity.

9. Pursuant to this section and Article II, Section 6 herein, SANBAG must reimburse BNSF in full for the actual costs of all work performed by BNSF under this Agreement.

10. All expenses detailed in statements sent to SANBAG pursuant to Article II, Section 6 herein will comply with the terms and provisions of the Federal Aid Highway Program Manual, U.S. Department of Transportation, as amended from time to time, which manual is hereby incorporated into and made a part of this Agreement by reference. The parties mutually agree that BNSF's preliminary engineering, design, and contract preparation costs described in Article II, Section 2 herein are part of the costs of the Project

even though such work may have preceded the date of this Agreement and the issuance of Notice to Proceed as more particularly described in Article III, Section 13.

11. The parties mutually agree that no construction activities for the Project, nor future maintenance of the Structure once completed, that would interfere with operations of the Rail Corridor will be permitted during the fourth quarter of each calendar year. Emergency work will be permitted only upon prior notification to BNSF's Network Operations Center (telephone number: 800 832-5452). The parties hereto mutually understand and agree that trains cannot be subjected to delay during this time period.

12. Subject to the restrictions imposed by Article V, Section 11 above, the construction of the Project will not commence until SANBAG gives BNSF's Manager of Public Projects thirty (30) days prior written notice of such commencement. The commencement notice will reference BNSF's file number 026113F. and must state the time that construction activities will begin.

13. Within 90 days of the conclusion of the Project and final acceptance by BNSF, SANBAG must provide BNSF with a complete electronic set of the bridge plans with the railroad clearances (prepared in English Units). BNSF will also accept a marked up paper copy of the bridge plans labeled "**As Built**". The marked up copy of those plans will reflect any and all deviations from the original plans that occurred during construction. The electronic set of bridge plans will be submitted in Micro Station *.dgn electronic format (preferred) or AutoCAD *.dwg format. Electronic plans are to be submitted in the original format used for CAD plan preparation and not converted to another format prior to submission. The "As Built" plans shall show actual measured "as constructed" clearances as well as depth, size and location of all foundation components. The plans shall show dimensioned locations of existing and relocated utilities. The As Built plans must comply with the Bridge Requirements set forth on Exhibit F and depict all information in BNSF engineering stationing and mile post pluses. The As Built plans must also include plan and profile, structural bridge drawings and specifications, and drainage plans. All improvements and facilities must be shown. It is understood that BNSF prefers to receive the "As Built" plans in an electronic format.

14. BNSF may, at its expense, make future changes or additions to the railroad components of the Structure if necessary or desirable, in BNSF's sole discretion, including, without limitation the following: (i) the right to raise or lower the grade or change the alignment of its tracks, (ii) the right to lay additional track or tracks, or (iii) the right to build other facilities in connection with the operation of its railroad. Such changes or additions must not change or alter the highway components of the Structure. If it becomes necessary or desirable in the future to change, alter, widen or reconstruct the highway components of the Structure to accommodate railroad projects, the cost of such work, including any cost incidental to alteration of railroad or highway facilities made necessary by any such changes to the Structure, will be divided between BNSF and STATE in such shares as may be mutually agreed to by the parties hereto. Any alteration or reconstruction of the highway components of the Structure will be covered by a Commission order.

15. STATE may, at STATE's sole expense, alter or reconstruct the highway components of the Structure if necessary or desirable, due to traffic conditions or pedestrian or other recreational traffic, provided, however, that any such alteration or reconstruction must not encroach further upon or occupy the surface of BNSF's Rail Corridor to a greater extent than is contemplated by the plans and specifications to be approved by BNSF pursuant to Article III, Section 1 herein, without obtaining BNSF's prior written consent and the execution of a supplement to this Agreement or the completion of a separate agreement. Any alteration or reconstruction of the highway components of the Structure will be covered by a Commission order.

16. Any books, papers, records and accounts of the parties hereto relating to the work hereunder or the costs or expenses for labor and material connected with the construction will at all reasonable times be open to inspection and audit by the agents and authorized representatives of the parties hereto and the Federal Highway Administration, for a period of three (3) years from the date of the final BNSF invoice under this Agreement.

17. The covenants and provisions of this Agreement are binding upon and inure to the benefit of the successors and assigns of the parties hereto. Notwithstanding the preceding sentence, no party hereto may assign any of its rights or obligations hereunder without the prior written consent of the other party.

18. In the event construction of the Project does not commence within three (3) years of the Effective Date, this Agreement will become null and void.

19. Neither termination nor expiration of this Agreement will release any party from any liability or obligation under this Agreement, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination or expiration.

20. To the maximum extent possible, each provision of this Agreement will be interpreted in such a manner as to be effective and valid under applicable law. If any provision of this Agreement is prohibited by, or held to be invalid under, applicable law, such provision will be ineffective solely to the extent of such prohibition or invalidity and the remainder of the provision will be enforceable.

21. Only that portion of the aforesaid Original Agreement between the STATE and Santa Fe that pertains to the Ninth Street Overhead as originally constructed shall terminate on the completion date of the Project as provided for in Article III, Section 11 of this Agreement. The Original Agreement shall remain in full force and effect for the remaining four grade separations, Baseline Street, 16th Street, Massachusetts Avenue, and 27th Street until they are terminated by separate agreement. Such termination shall not release any party thereto from any liability or obligation thereunder, resulting from any act, omission or event happening prior to the date of termination or thereafter, in the event the terms of said Original Agreement provide that anything shall or may be done after termination thereof.

22. This Agreement (including exhibits and other documents, manuals, etc. incorporated herein), together with previously acquired and recorded property rights if any, is the full and complete agreement between BNSF, STATE and SANBAG with respect to the subject matter herein and supersedes any and all other prior agreements between the parties hereto.

23. Any notice provided for herein or concerning this Agreement must be in writing and will be deemed sufficiently given when sent by certified mail, return receipt requested, to the parties at the following addresses:

BNSF Railway Company:

BNSF's Manager of Public Projects
740 E. Carnegie Drive
San Bernardino, CA. 92408
Email: Melvin.Thomas@bnsf.com

Director Structural Engineering
4515 Kansas Avenue
Kansas City, KS 66106
Email: Byron.Burns@bnsf.com

SANBAG:

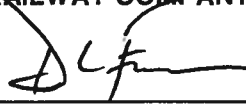
San Bernardino Associated Governments
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410
Attn. Director of Freeway Construction
Fax: 909 388 2002

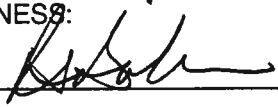
STATE:

Department of Transportation
Division of Right of Way – Railroad Agreements
1120 N. Street, MS 37
Sacramento, CA. 95814

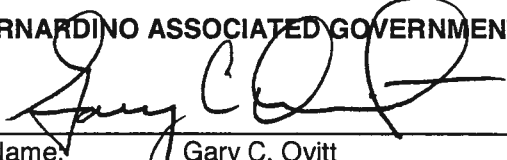
IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed and attested by its duly qualified and authorized officials as of the day and year first above written.

BNSF RAILWAY COMPANY

By:  1/17/09
Printed Name: David L. Freeman
Title: Vice President Engineering

WITNESS:



SAN BERNARDINO ASSOCIATED GOVERNMENTS

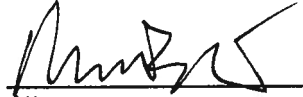
By: 
Printed Name: Gary C. Ovitt
Title: President - Board of Directors

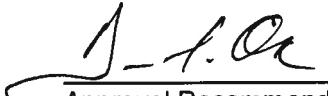
APPROVED AS TO FORM:


Jean Rene Basle
SANBAG Counsel

STATE OF CALIFORNIA, acting by and through its
Department of Transportation

By: 
Printed Name: Donald E. Grebe
Title: Chief, Office of Project Delivery
Division of Right of Way and Land Surveys

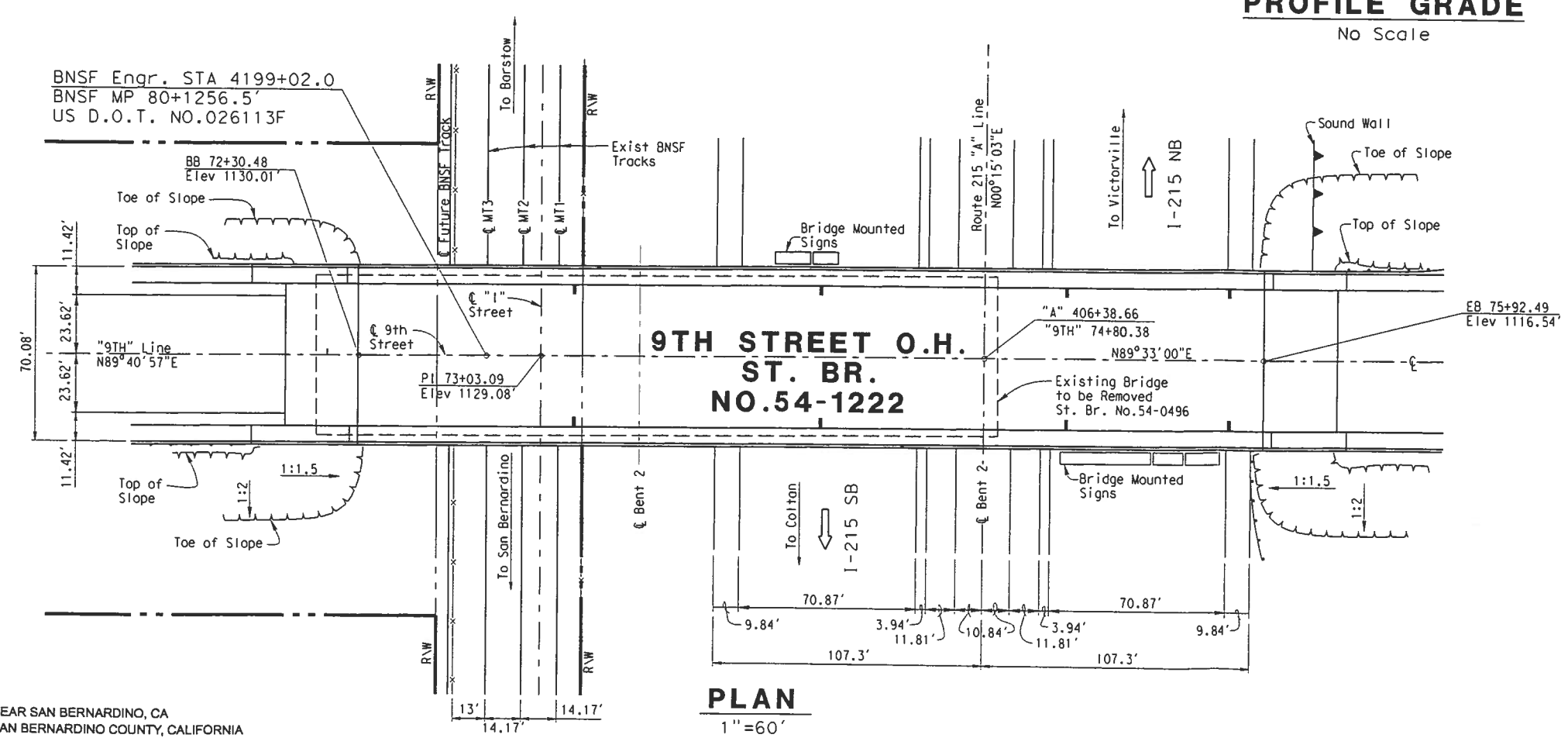
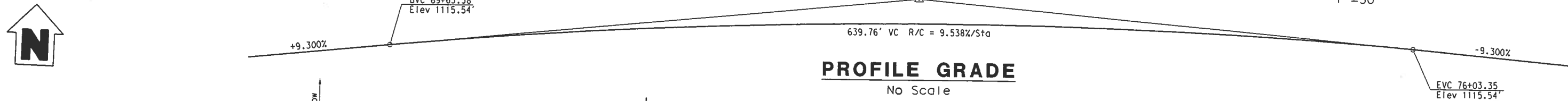
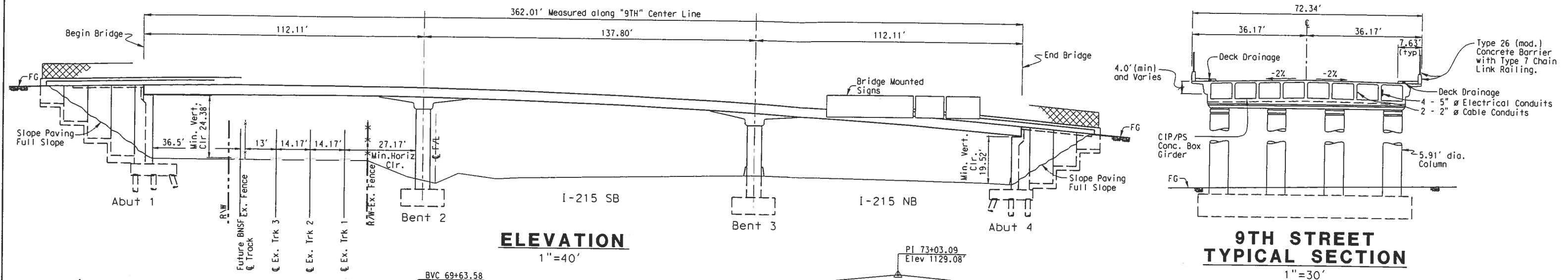

Attorney
Department of Transportation


Approval Recommended
Department of Transportation

FORT WORTH, TEXAS
SCALE: AS NOTED
CALIFORNIA DIVISION
CAJON SUBDIVISION
LINE SEGMENT 7600

EXHIBIT "A"
ATTACHED TO A CONTRACT BETWEEN
BNSF RAILWAY COMPANY
AND
THE STATE OF CALIFORNIA
AND
SAN BERNARDINO ASSOCIATED GOVERNMENTS

DAVID L. FREEMAN
VICE PRES. ENGINEERING



DESCRIPTION
9TH STREET OVERHEAD
US D.O.T. NO. 026113F
ST. BR. NO. 54-1222
RECONSTRUCT THE EXISTING 9TH STREET BRIDGE
OVER BNSF'S RAIL CORRIDOR AND TRACKS.
NEW BRIDGE APPROXIMATELY 72' WIDE AND 362' LONG.

NEAR SAN BERNARDINO, CA
SAN BERNARDINO COUNTY, CALIFORNIA

9th STREET OVERHEAD
EXHIBIT "A"

EXHIBIT "B"

TEMPORARY CONSTRUCTION LICENSE

EXHIBIT B

**TEMPORARY CONSTRUCTION LICENSE
(Ninth Street Overhead)**

THIS TEMPORARY CONSTRUCTION LICENSE FOR the demolition, reconstruction and maintenance of the Ninth Street Overhead ("Temporary Construction License") is made and entered into as of the 29th. day of April, 2009, by and between BNSF RAILWAY COMPANY, a Delaware corporation ("Licensor"), and **SAN BERNARDINO ASSOCIATED GOVERNMENTS**, a body corporate and politic of the State of California, ("Licensee").

A. Licensor owns or controls certain real property situated at or near the vicinity of San Bernardino, County of San Bernardino, State of California, at Mile Post 80.24, Line Segment 7600, [Project # Ninth Street Overhead], as described or depicted on Exhibit "A" and Exhibit "C" PARCEL MAP, Parcel No. 19162-2 and Parcel No. 19162-3 attached hereto and made a part hereof (the "Premises").

B. Licensor and Licensee have entered into that certain Overhead Agreement dated as of MARCH 4, 2009 concerning improvements on or near the Premises (the "Overhead Agreement").

C. Licensee has requested that Licensor grant to Licensee a temporary non-exclusive license over the Premises in connection with the demolition and reconstruction of the Ninth Street Overhead as defined in the Overhead Agreement.

D. Licensor has agreed to grant Licensee such license, subject to the terms and conditions hereinafter set forth.

NOW, THEREFORE, for and in consideration of the foregoing recitals which are incorporated herein, the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

Section 1 Granting of License.

1.1 License Purpose. Licensee shall use the Premises for such purposes as are necessary and incidental to the demolition and reconstruction of the Ninth Street Overhead as is set forth in the Overhead Agreement.

1.2 Grant. Licensor does hereby grant unto Licensee a temporary non-exclusive license ("License") over the Premises for the License Purpose and for no other purpose. The License is granted subject to any and all restrictions, covenants, easements, licenses, permits, leases and other encumbrances of whatsoever nature whether or not of record, if any, relating to the Premises and subject to all with all applicable federal, state and local laws, regulations, ordinances, restrictions, covenants and court or administrative decisions and orders, including Environmental Laws (defined below) and zoning laws (collectively, "Laws"). Licensee may not make any alterations or improvements or perform any maintenance or repair activities within the Premises except in accordance with the terms and conditions of the Overhead Agreement.

1.3 **Reservations by Licensor.** Licensor excepts and reserves the right, to be exercised by Licensor and any other parties who may obtain written permission or authority from Licensor:

- (a) to install, construct, maintain, renew, repair, replace, use, operate, change, modify and relocate any existing pipe, power, communication, cable, or utility lines and appurtenances and other facilities or structures of like character (collectively, "Lines") upon, over, under or across the Premises;
- (b) to install, construct, maintain, renew, repair, replace, use, operate, change, modify and relocate any tracks or additional facilities or structures upon, over, under or across the Premises; and
- (c) to use the Premises in any manner as the Licensor in its sole discretion deems appropriate, provided Licensor uses all reasonable efforts to avoid material interference with the use of the Premises by Licensee for the License Purpose.

Section 2 Term of License. The term of the Temporary Construction License shall be for a term beginning on the authorized commencement date as set forth in Article III, Section 10 (c) ("Effective Date") of said Overhead Agreement and ending on the earlier of (i) completion of the Project, or (ii) Twenty four (24) months following the Effective Date of the Temporary Construction License, whichever occurs first. Said Temporary Construction License may be extended upon the written consent of both parties for an additional fee.

Section 3 No Warranty of Any Conditions of the Premises. Licensee acknowledges that Licensor has made no representation whatsoever to Licensee concerning the state or condition of the Premises, or any personal property located thereon, or the nature or extent of Licensor's ownership interest in the Premises. Licensee has not relied on any statement or declaration of Licensor, oral or in writing, as an inducement to entering into this Temporary Construction License, other than as set forth herein. LICENSOR HEREBY DISCLAIMS ANY REPRESENTATION OR WARRANTY, WHETHER EXPRESS OR IMPLIED, AS TO THE DESIGN OR CONDITION OF ANY PROPERTY PRESENT ON OR CONSTITUTING THE PREMISES, ITS MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, THE QUALITY OF THE MATERIAL OR WORKMANSHIP OF ANY SUCH PROPERTY, OR THE CONFORMITY OF ANY SUCH PROPERTY TO ITS INTENDED USES. LICENSOR SHALL NOT BE RESPONSIBLE TO LICENSEE OR ANY OF LICENSEE'S CONTRACTORS FOR ANY DAMAGES RELATING TO THE DESIGN, CONDITION, QUALITY, SAFETY, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY PROPERTY PRESENT ON OR CONSTITUTING THE PREMISES, OR THE CONFORMITY OF ANY SUCH PROPERTY TO ITS INTENDED USES. LICENSEE ACCEPTS ALL RIGHTS GRANTED UNDER THIS TEMPORARY CONSTRUCTION LICENSE IN THE PREMISES IN AN "AS IS, WHERE IS" AND "WITH ALL FAULTS" CONDITION, AND SUBJECT TO ALL LIMITATIONS ON LICENSOR'S RIGHTS, INTERESTS AND TITLE TO THE PREMISES. Licensee has inspected or will inspect the Premises, and enters upon Licensor's rail corridor and property with knowledge of its physical condition and the danger inherent in Licensor's rail operations on or near the Premises. Licensee acknowledges that this Temporary Construction License does not contain any implied warranties that Licensee or Licensee's Contractors (as hereinafter defined) can successfully construct or operate the Improvements.

Section 4 Nature of Licensor's Interest in the Premises. LICENSOR DOES NOT WARRANT ITS TITLE TO THE PREMISES NOR UNDERTAKE TO DEFEND LICENSEE IN THE PEACEABLE POSSESSION OR USE THEREOF. NO COVENANT OF QUIET ENJOYMENT IS MADE. In case of the eviction of Licensee by anyone owning or claiming title to or any interest in the Premises, or by the abandonment by Licensor of the affected rail corridor, Licensor shall not be liable to refund Licensee any compensation paid hereunder.

Section 5 **Improvements.** Licensee shall take, in a timely manner, all actions necessary and proper to the lawful establishment, construction, operation, and maintenance of the Improvements, including such actions as may be necessary to obtain any required permits, approvals or authorizations from applicable governmental authorities. Any and all cuts and fills, excavations or embankments necessary in the construction, maintenance, or future alteration of the Improvements shall be made and maintained in such manner, form and extent as will provide adequate drainage of and from the adjoining lands and premises of the Licensor; and wherever any such fill or embankment shall or may obstruct the natural and pre-existing drainage from such lands and premises of the Licensor, the Licensee shall construct and maintain such culverts or drains as may be requisite to preserve such natural and pre-existing drainage, and shall also wherever necessary, construct extensions of existing drains, culverts or ditches through or along the premises of the Licensor, such extensions to be of adequate sectional dimensions to preserve the present flowage of drainage or other waters, and of materials and workmanship equally as good as those now existing. In the event any construction, repair, maintenance, work or other use of the Premises by Licensee will affect any Lines, fences, buildings, improvements or other facilities (collectively, "Other Improvements"), Licensee will be responsible at Licensee's sole risk to locate and make any adjustments necessary to such Other Improvements. Licensee must contact the owner(s) of the Other Improvements notifying them of any work that may damage these Other Improvements and/or interfere with their service and obtain the owner's written approval prior to so affecting the Other Improvements. Licensee must mark all Other Improvements on the Plans and Specifications and mark such Other Improvements in the field in order to verify their locations. Licensee must also use all reasonable methods when working on or near Licensor's property to determine if any Other Improvements (fiber optic, cable, communication or otherwise) may exist.

Section 6 **Taxes.** Licensee shall pay when due any taxes, assessments or other charges (collectively, "Taxes") levied or assessed upon the Improvements by any governmental or quasi-governmental body or any Taxes levied or assessed against Licensor or the Premises that are attributable to the Improvements. In the event of Licensee's failure to do so, if Licensor shall become obligated to do so, Licensee shall be liable for all costs, expenses and judgments to or against Licensor, including all of Licensor's legal fees and expenses.

Section 7 **Environmental.** Licensee shall be bound by and hereby agrees to the environmental provisions set forth in Exhibit B-1, Exhibit C, and Exhibit G, which are attached to and made a part of the Overhead Agreement as if fully set forth herein.

Section 8 **Default and Termination.**

8.1 **Licensor's Performance Rights.** If at any time Licensee, or Licensee's Contractors, fails to properly perform its obligations under this Temporary Construction License, Licensor, in its sole discretion, may: (i) seek specific performance of the unperformed obligations, or (ii) at Licensee's sole cost, may arrange for the performance of such work as Licensor deems necessary for the safety of its rail operations, activities and property, or to avoid or remove any interference with the activities or property of Licensor, or anyone or anything present on the rail corridor or property with the authority or permission of Licensor. Licensee shall promptly reimburse Licensor for all costs of work performed on Licensee's behalf upon receipt of an invoice for such costs. Licensor's failure to perform any obligations of Licensee or Licensee's Contractors shall not alter the liability allocation set forth in this Temporary Construction License.

8.2 **Effect of Termination or Expiration.** Neither termination nor expiration will release Licensee from any liability or obligation under this License, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination or expiration, or, if later, the date the Premises are restored as required by Section 9.

8.3 **Non-exclusive Remedies.** The remedies set forth in this Section 8 shall be in addition to, and not in limitation of, any other remedies that Licensor may have under the Overhead Agreement, at law or in equity.

Section 9 Surrender of Premises. If said described premises, or any part thereof, shall at any time cease to be used by said Licensee, or by the public, for the purpose, as aforesaid for a period of two (2) consecutive years, or should they be converted to any other use whatsoever, or should the Licensee fail to perform any of the conditions herein expressed, then upon written request by the Licensor, Licensee shall immediately request abandonment in accordance with the applicable statutes or laws of the State of California, and, subject to appropriations being made for the purpose by the California Transportation Commission, Licensee shall restore Premises to their prior condition.

Section 10 Liens. Licensee shall promptly pay and discharge any and all liens arising out of any construction, alterations or repairs done, suffered or permitted to be done by Licensee on the Premises or attributable to Taxes that are the responsibility of Licensee pursuant to Section 6. Licensor is hereby authorized to post any notices or take any other action upon or with respect to the Premises that is or may be permitted by Law to prevent the attachment of any such liens to any portion of the Premises; provided, however, that failure of Licensor to take any such action shall not relieve Licensee of any obligation or liability under this Section 10 or any other section of this Temporary Construction License.

Section 11 Tax Exchange. Licensor reserves the right to assign this Temporary Construction License to Apex Property & Track Exchange, Inc. ("Apex"). Apex is a qualified intermediary within the meaning of Section 1031 of the Internal Revenue Code of 1986, as amended, and Treas. Reg. § 1.1031(k)-1(g), for the purpose of completing a tax-deferred exchange under said Section 1031. Licensor shall bear all expenses associated with the use of Apex, or necessary to qualify this transaction as a tax-deferred exchange, and, except as otherwise provided herein, shall protect, reimburse, indemnify and hold harmless Licensee from and against any and all reasonable and necessary additional costs, expenses, including, attorneys fees, and liabilities which Licensee may incur as a result of Licensor's use of Apex or the qualification of this transaction as a tax-deferred transaction pursuant to Section 1031. Licensee shall cooperate with Licensor with respect to this tax-deferred exchange, and upon Licensor's request, shall execute such documents as may be required to effect this tax-deferred exchange.

Section 12 Notices. Any notice required or permitted to be given hereunder by one party to the other shall be delivered in the manner set forth in the Overhead Agreement. Notices to Licensor under this License shall be delivered to the following address: BNSF Railway Company, Real Estate Department, 2500 Lou Menk Drive, Ft. Worth, TX 76131, Attn: Permits, or such other address as Licensor may from time to time direct by notice to Licensee.

Section 13 Recordation. It is understood and agreed that this Temporary Construction License shall not be recorded.

Section 14 Miscellaneous.

14.1 All questions concerning the interpretation or application of provisions of this Temporary Construction License shall be decided according to the substantive laws of the State of California without regard to conflicts of law provisions.

14.2 In the event that Licensee consists of two or more parties, all the covenants and agreements of Licensee herein contained shall be the joint and several covenants and agreements of such parties. This instrument and all of the terms, covenants and provisions hereof shall inure to the benefit of and be binding upon each of the parties hereto and their respective legal representatives, successors and assigns and shall run with and be binding upon the

Premises.

14.3 If any action at law or in equity is necessary to enforce or interpret the terms of this Temporary Construction License, the prevailing party or parties shall be entitled to reasonable attorneys' fees, costs and necessary disbursements in addition to any other relief to which such party or parties may be entitled.

14.4 If any provision of this Temporary Construction License is held to be illegal, invalid or unenforceable under present or future Laws, such provision will be fully severable and this Temporary Construction License will be construed and enforced as if such illegal, invalid or unenforceable provision is not a part hereof, and the remaining provisions hereof will remain in full force and effect. In lieu of any illegal, invalid or unenforceable provision herein, there will be added automatically as a part of this Temporary Construction License a provision as similar in its terms to such illegal, invalid or unenforceable provision as may be possible and be legal, valid and enforceable.

14.5 This Temporary Construction License is the full and complete agreement between Licensors and Licensee with respect to all matters relating to Licensee's use of the Premises, and supersedes any and all other agreements between the parties hereto relating to Licensee's use of the Premises as described herein. However, nothing herein is intended to terminate any surviving obligation of Licensee or Licensee's obligation to defend and hold Licensors harmless in any prior written agreement between the parties.

14.6 Time is of the essence for the performance of this Temporary Construction License.

14.7 The terms of the Overhead Agreement are incorporated herein as if fully set forth in this instrument which terms shall be in full force and effect for purposes of this License.

Witness the execution of this Temporary Construction License as of the date first set forth above.

LICENSOR:

BNSF RAILWAY COMPANY, a Delaware corporation

By: 
Name: David P. Schneider
Title: General Director - Land Revenue Management

LICENSEE:

SAN BERNARDINO ASSOCIATED GOVERNMENTS
a body corporate and politic of the State of California

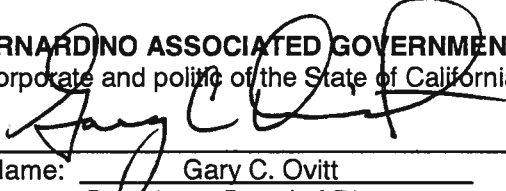
By: 
Printed Name: Gary C. Ovitt
Title: President - Board of Directors

EXHIBIT "A"

08-SBd-215-12.38 (KP)
#19162-2

Parcel 19162-2

A temporary easement for construction purposes and incidents thereto, over, under and across that portion of that certain street commonly known as "I" Street, 25.146 meters (82.50 feet) wide, in the City of San Bernardino, County of San Bernardino, State of California, as shown by the Map of the Survey of San Bernardino Rancho, filed in Book 7, page 2, County Recorder of said County, described as follows:

COMMENCING at the southeast corner of Block 19 as shown on said Map; thence along the east line of said Block 19 and the west right of way of said "I" Street, North 00°24'10" West, 2.930 meters (9.61 feet) to the **POINT OF BEGINNING**; thence continuing along said right of way North 00°24'10" West, 10.403 meters (34.13 feet); thence South 89°45'00" East, 17.598 meters (57.74 feet) to the westerly right of way of State Route 215; thence along said right of way of State Route 215, South 00°25'12" East, 10.195 meters (33.45 feet); thence South 89°34'18" West, 17.600 meters (57.74 feet) to the **POINT OF BEGINNING**.

08-SBd-215-12.38 (KP)
#19162-3

Parcel 19162-3

A temporary easement for construction purposes and incidents thereto, over, under and across that portion of that certain street commonly known as "I" Street, 25.146 meters (82.50 feet) wide, in the City of San Bernardino, County of San Bernardino, State of California, as shown by the Map of the Survey of San Bernardino Rancho, filed in Book 7, page 2, County Recorder of said County, described as follows:

COMMENCING at the northeast corner of Block 18 as shown on said Map; thence along the east line of said Block 18 and the west right of way of said "I" Street, South 00°28'25" East, 2.974 meters (9.76 feet) to the **POINT OF BEGINNING**; thence North 89°34'19" East, 17.591 meters (57.71 feet) to the westerly right of way of State Route 215; thence along said right of way of State Route 215, South 00°25'45" East, 16.662 meters (54.67 feet); thence North 89°44'59" West, 17.579 meters (57.68 feet) to said east line and said west right of way of "I" Street; thence along said west right of way of "I" Street, North 00°28'25" West, 16.454 meters (53.98 feet) to the **POINT OF BEGINNING**.

The bearings and distances used in the above descriptions of parcels 19162-2 and 19162-3 are based on the California Coordinate System of 1983, Zone 5. Multiply distances shown by 1.000068345 to obtain ground level distances.

These real property descriptions have been prepared by me, or under my direction, in conformance with the Professional Land Surveyors Act.

Signature: _____

Professional Land Surveyor

Date: _____

Nov. 25, 2008



DIST.	COUNTY	ROUTE	KILOMETER POST
08	SBd.	215	12.38



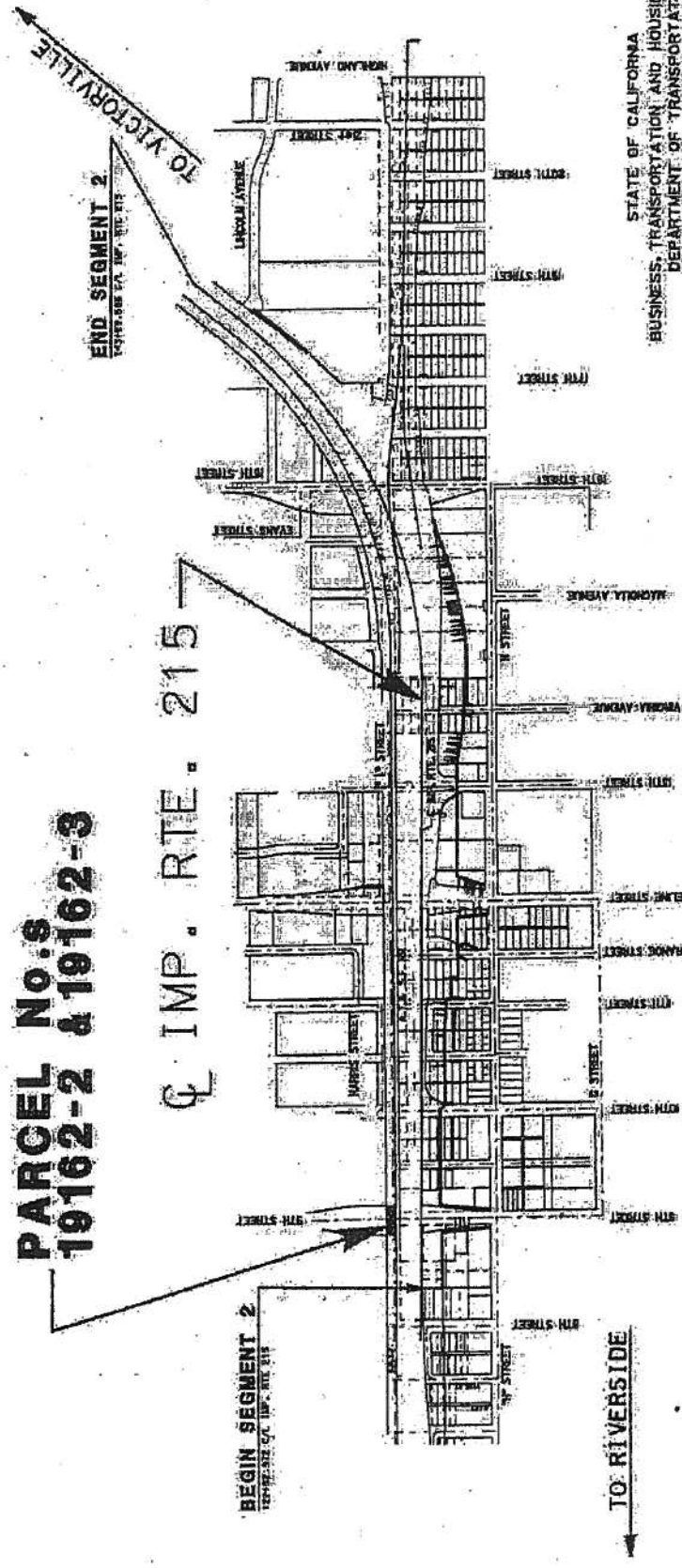
EXHIBIT "C"

SHEET 1 OF 2



**PARCEL No.s
19162-2 & 19162-3**

Q IMP. RTE. 215



STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

RANDHO SAN BERNARDINO
M.B. 7 / 2

PARCEL INDEX MAP

CITY OF
SAN BERNARDINO

NO SCALE

DIST.	COUNTY	ROUTE	KILOMETER POST
08	SBd	215	12.38

EXHIBIT "C"

SHEET 2 OF 2

RANCH D

SAN BERNARDINO

272

PARCEL No. 19162-2

ALOCK

NO. 2410NW
0.403m (34.13')

Q W STREET

EXISTING R/W

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

PARCEL MAP

PARCEL No. 19162-3

EXHIBIT "B-1"

EASEMENT

WHEN RECORDED MAIL TO:

Betty Bobosik, Chief
Department of Transportation
Right of Way Railroad Coordinator
Dist. 07, D-08
464 W. 4th St., 6th Floor MS-M
San Bernardino, CA 92401-1400

Recorded in Official Records,
County of San Bernardino
Doc#: 2009-0185334
4/30/2009 2:09 PM

MAIL TAX STATEMENTS TO:

SPACE ABOVE THIS LINE FOR RECORDER'S USE

DOCUMENTARY TRANSFER TAX \$ _____

...Computed on the consideration or value of Property conveyed, OR
...Computed on the consideration or value less liens or encumbrances
remaining at time of sale.

RECORDER: Please make no
charge for recording the attached instru-
ment per Govt. Code Sec. 6103. It is being
recorded in connection with a Governmental
Agency transaction _____

Signature of Declarant or Agent determining Tax - Firm Name

EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that **BNSF RAILWAY COMPANY**, (formerly known as The Burlington Northern and Santa Fe Railway Company and successor by merger to The Atchison, Topeka and Santa Fe Railway Company) a Delaware corporation, whose address for purposes of this instrument is 2500 Lou Menk Drive, Fort Worth, Texas 76131-2830, Grantor, for Twenty Two Thousand Nine Hundred Sixty Nine and No/100 Dollars (**\$22,969.00**) to it paid by **STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION**, Grantee, and the promises of the Grantee hereinafter specified, does hereby grant unto the Grantee, subject to the terms and conditions hereinafter set forth, an **EASEMENT** for the purpose of constructing, reconstructing, removing, replacing, inspecting, repairing, maintaining and operating an overhead structure supporting columns and footings, including any and all appurtenances thereto, over, under, upon and across the described real property, together with all abutter's rights of access to and from Grantor's remaining property to the structure, and for no other purpose, located at Railroad Mile Post 80.24, Line Segment 7600, hereinafter called Structure, over, upon and across the premises, situated in the City of San Bernardino, County of San Bernardino, State of California, being more particularly described on Exhibit "A" and shown on Exhibit "B" PARCEL MAP, Parcel No. 19162-1, attached hereto and by this reference made a part hereof.

ALSO, TOGETHER with the non-exclusive right of access to the easement hereinabove described by way of such roads or passageways as may now or hereafter exist on Grantor's remaining property; provided, however, that Grantee's exercise of such right of access shall not unreasonably interfere with Grantor's use of such roads or passageways, and subject to advance notification, and coordination with Grantor.

RESERVING, however, unto the Grantor, its successors and assigns, all rights in and to airspace at an elevation higher than a plane parallel with and thirty (30) feet above the roadway surface of said structure as originally constructed, and the right to construct, place, operate, maintain, alter, repair, replace, renew, improve and remove communication lines above, below and on the surface of the premises, including, without limitation, transmission by conduit, fiber optics, cable, wire or other means of electricity, voice data, video, digitized information, or other materials or information, pipelines, utility lines, track and facilities including the right of ingress and egress, in any such manner as does not unreasonably interfere with Grantee's use, enjoyment, safety and compatibility of the premises for said Structure, and further reserving unto Grantor, its successors and assigns, all right and privilege of ingress

and egress to said premises as Grantor, its successors and assigns may require to investigate and remediate environmental contamination and hazards, and further reserving the right and privilege to use said land for any and all purposes not inconsistent with the use, enjoyment, safety and compatibility thereof for said Structure.

This easement is subject and subordinate to the continuing right and obligation of Grantor, its successors and assigns, to use the area of land under the Structure in the performance of its public duty as a common carrier, and for that purpose Grantor expressly reserves for itself and its successors and assigns, the right to construct, reconstruct, maintain and operate existing or any additional railroad tracks, facilities and appurtenances thereto upon, along and across the area of land under the Structure in such manner as may be consistent with Grantee's use and enjoyment of the easement herein granted; provided, further, that in the event the area of land under the Structure is transferred to a non-transportation entity, such transferee's use of the land under the Structure shall be subject to the following limitations and conditions:

1. No use may be made of the area of land under the easement hereinabove described which would impair the full use and safety of said Structure, or would otherwise interfere with the free flow of traffic thereon or would unreasonably impair the maintenance thereof.
2. No use may be made of the area of land under said easement hereinabove described for the manufacture or storage of flammable, volatile, explosive or corrosive substances, and such substances shall not be brought onto said land except in such quantities as are normally required for the maintenance operations of occupants of said land and except as may be transported by rail or pipelines. Installation of any pipelines carrying volatile substances shall have the written approval of the Grantee as to the safety and compatibility with structure purposes and such discretion shall not be exercised in a capricious or arbitrary manner. The use of any such substances shall be in conformance with all applicable code requirements.
3. No hazardous or unreasonably objectionable smoke, fumes, vapors, dust or odors shall be permitted, which would adversely affect the use or maintenance of said Structure or the traveling public thereon.
4. No building of combustible construction shall hereafter be constructed on the area of land under the easement hereinabove described. The Grantee shall be given the opportunity to review and approve plans for any construction within said easement area 60 days prior to said construction. No buildings, no permanent structures, and no advertising displays, may be constructed within fifteen (15) feet (measured horizontally) of the sides of said structure without the express written approval of the Grantee. The Grantee shall have the discretion to determine whether such proposed construction will be inimical to or incompatible with the full enjoyment of the public rights in the Structure or against the public interest, but such discretion shall not be exercised in a capricious or arbitrary manner.

The foregoing easement is further made subject to and upon the following express conditions:

1. To existing interests in the above-described premises to whomsoever belonging and of whatsoever nature and any and all extensions and renewals thereof, including but not limited to underground pipe line or lines, or any type of wire line or lines, if any.
2. Any and all cuts and fills, excavations or embankments necessary in the construction, maintenance, or future alteration of said Structure shall be made and maintained in such manner, form and extent as will provide adequate drainage of and from the adjoining lands and premises of the Grantor; and wherever any such fill or embankment shall or may obstruct the natural and pre-existing drainage from such lands and premises of the Grantor, the Grantee shall construct and maintain such culverts or drains as may be requisite to preserve such natural and pre-existing drainage, and shall also wherever necessary, construct extensions of existing drains, culverts or ditches through or along the premises of the

Grantor, such extensions to be of adequate sectional dimensions to preserve the present flowage of drainage or other waters, and of materials and workmanship equally as good as those now existing.

3. The Grantee shall bear the cost of removal, relocation or reconstruction of any and all right of way fences, telephone or telegraph poles, or other facilities, the removal, relocation or reconstruction of which may be made necessary by reason of the use of said premises for said Structure purposes.
4. The Grantee shall, at its own cost and expense, make adjustment with industries or other lessees of Grantor for buildings or improvements that may have to be relocated, reconstructed or destroyed by reason of the construction and maintenance of said Structure on said premises.
5.
 - a. If during the construction or subsequent maintenance of said Structure, soils or other materials considered to be environmentally contaminated are exposed within the easement area, Grantee will promptly notify Grantor and will remove to the depth and width necessary to fully remediate said exposure and safely dispose of said contaminated soils and/or materials. If requested by Grantor, such soil shall be replaced with clean fill. Grantee shall indemnify, protect and defend the Grantor from any and all liability, claims or demands, if any, which arise as a result of exposure and/or removal of said contaminated soils or materials by Grantee. Liability for the management and removal of existing contaminated soils or materials, if any, within the easement area that are not disturbed by Grantee's construction or maintenance of its project, other than those soils necessary to fully remediate any disturbance caused by such construction or maintenance, shall remain the sole responsibility of the Grantor. Determination of soils contamination and applicable disposal procedures thereof, will be made only by an agency having the capacity and authority to make such a determination.
 - b. In the event that excavated soil or material is to be removed and transported off-site, Grantee shall, prior to any removal and/or transport, present for Engineer's review, an acceptable environmental management plan ("EMP"). Grantee must obtain written consent from Engineer prior to removal and/or transportation of Excavated Material. Such consent shall not constitute approval of the chosen removal or transportation methodology, or whether the EMP complies with any or all local, state, federal or engineering standards.
6. Grantor and Grantee have entered into that certain Overhead Agreement dated as of MARCH 4, 2009 concerning the Premises (the "Overhead Agreement"). The terms of the Overhead Agreement, as may be amended from time to time, are incorporated herein as if fully set forth in this instrument which terms shall be in full force and effect for purposes of this Easement even if the Overhead Agreement is, for whatever reason, no longer in effect.
7. Grantee shall pay when due any taxes, assessments or other charges (collectively, "**Taxes**") levied or assessed upon the Improvements by any governmental or quasi-governmental body or any Taxes levied or assessed against Grantor or the Premises that are attributable to the Improvements. Grantee agrees to purchase, affix and cancel any and all documentary stamps in the amount prescribed by statute, and to pay any and all required transfer taxes, excise taxes and any and all fees incidental to recordation of the Easement. In the event of Grantee's failure to do so, if Grantor shall become obligated to do so, Grantee shall be liable for all costs, expenses and judgments to or against Grantor, including all of Grantor's legal fees and expenses.
8. The Grantee or its contractor(s) shall telephone Grantor's Communication Network Control Center at (800) 533-2891 (a 24 hour number) to determine if fiber optic cable is buried anywhere on the premises; and if so, the Grantee or its contractor(s) will contact the Telecommunications Company(ies) involved, and make arrangements with the Telecommunications Company(ies) for protection of the fiber optic cable prior to beginning any work on the premises.

9. If said described premises, or any part thereof, shall at any time voluntarily cease to be used by said Grantee, or by the public, for the purpose, as aforesaid for a period of two (2) consecutive years, or should they be converted to any other use whatsoever, or should the Grantee fail to perform any of the conditions herein expressed after notice and a reasonable opportunity to cure, then upon written request by the Grantor, Grantee shall immediately request abandonment in accordance with the applicable statutes or laws of the State of California, and, subject to appropriations being made for the purpose by the California Transportation Commission, Grantee shall, remove said structure and restore Railroad's premises to the condition existing prior to construction of said structure.
10. The Grantor does not warrant its title to said premises nor undertake to defend the Grantee in the peaceable possession, use or enjoyment thereof; and the grant herein made is subject to all outstanding rights or interest of others, including the tenants and licensees of the Grantor.
11. This easement shall be binding upon and inure to the benefit of the heirs, executors, administrators, assigns and successors of Grantor and Grantee.

TO HAVE AND TO HOLD THE SAME, together with all the hereditaments and appurtenances thereunto belonging to Grantee for public use and enjoyment for the purposes aforesaid and for no other purpose whatsoever subject to the terms and conditions hereinbefore stated.

The Grantor, for itself, its successors and assigns, hereby waives any claim for any and all damages to grantor's remaining property contiguous to the right of way hereby conveyed by reason of the location, construction or maintenance of said highway.

IN WITNESS WHEREOF, the said **BNSF RAILWAY COMPANY** has caused this instrument to be signed by its authorized officer, and the corporate seal affixed on the 24th day of APRIL, 2008.

BNSF RAILWAY COMPANY

By:

David P. Schneider
David P. Schneider
General Director-
Land Revenue Management



ATTEST:

By:

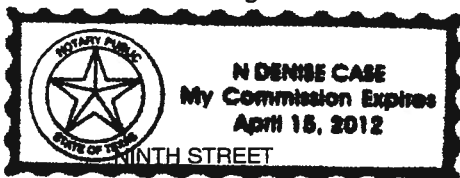
Patricia Zbichorski
Patricia Zbichorski
Assistant Secretary

STATE OF TEXAS)

) ss.

COUNTY OF TARRANT)

On this 24th day of APRIL, 2008, before me, the undersigned, a Notary Public in and for said County and State, personally appeared David P. Schneider and Patricia Zbichorski, known to me to be General Director-Land Revenue Management and Assistant Secretary, respectively, of the corporation that executed the within instrument on behalf of the Corporation therein named, and acknowledged to me that such Corporation executed the same.



Denise Case
Notary's Signature

I hereby certify under penalty of perjury
that the foregoing is true and correct.

Executed this 30 day of April, 2009

at San Bernardino, California

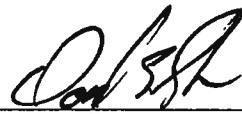
Margie Smith
Signature

On this 24th day of April, 2009, before me, the undersigned, a Notary Public in and for said County and State, personally appeared David P. Schneider and Patricia Zbichorski, known to me to be General Director-Land Revenue Management and Assistant Secretary, respectively, of the corporation that executed the within instrument on behalf of the Corporation therein named, and acknowledged to me that such Corporation executed the Same.

My Commission Expires: April 15, 2012

THIS IS TO CERTIFY, That the State of California, acting by and through the Department of Transportation (pursuant to Government Code Section 27281), hereby accepts for public purposes the real property described in the within deed and consents to the Recording thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this day of , 2008



Director of Transportation

FORM APPROVED BY LAW

EXHIBIT "A"

08-SBd-215-12.38 (KP)

#19162-1

Parcel 19162-1

An easement for freeway purposes, over, under, upon and across that portion of those certain streets commonly known as 9th and "I" Streets, 25.146 meters (82.50 feet) wide, in the City of San Bernardino, County of San Bernardino, State of California, as shown by the Map of the Survey of San Bernardino Rancho, filed in Book 7, page 2, County Recorder of said County, described as follows:

BEGINNING at the southeast corner of Block 19 as shown on said Map; thence along the east line of said Block 19 and the right of way of said "I" Street, North 00°24'10" West, 2.930 meters (9.61 feet); thence North 89°34'18" East, 17.600 meters (57.74 feet) to the westerly right of way of State Route 215; thence along said right of way of State Route 215, South 00°25'12" East, 28.098 meters (92.19 feet); thence continuing along last said right of way South 00°25'45" East, 2.952 meters (9.68 feet); thence South 89°34'19" West, 17.591 meters (57.71 feet) to the east line of Block 18 as shown on said Map and west right of way of said "I" Street; thence along said right of way of "I" Street, North 00°28'25" West, 2.974 meters (9.76 feet) to the northeast corner of said Block 18; thence North 00°26'16" West, 25.146 meters (82.50 feet) to the **POINT OF BEGINNING**.

The bearings and distances used in the above description are based on the California Coordinate System of 1983, Zone 5. Multiply distances shown by 1.000068345 to obtain ground level distances.

This real property description has been prepared by me, or under my direction, in conformance with the Professional Land Surveyors Act.

Signature: _____

Professional Land Surveyor

Date: _____

Nov. 25, 2008





DIST.	COUNTY	ROUTE	KILOMETER POST
08	Sbd.	216	12.38

EXHIBIT "B"
SHEET 1 of 2

PARCEL No. 19162-1

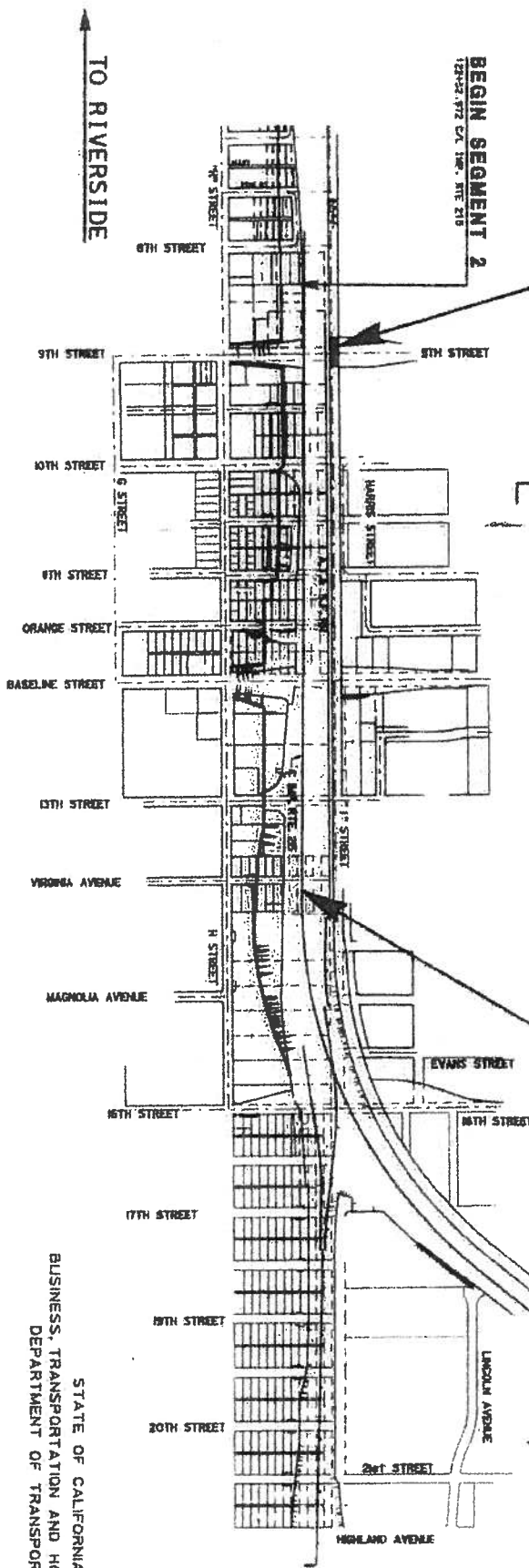
C IMP. RTE. 215

BEGIN SEGMENT 2
125+00.00 C/L IMP. RTE 215

END SEGMENT 2
13+00.00 C/L IMP. RTE 215

TO VICTORVILLE

TO RIVERSIDE



CITY OF
SAN BERNARDINO
RANCHO SAN BERNARDINO
M.B. 7 / 2

**PARCEL
INDEX MAP**

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

NO SCALE

CITY OF SAN BERNARDINO

RANCHO
SAN BERNARDINO
MB 7/2

BLOCK
18



DIST.	COUNTY	ROUTE	KILOMETER POST
08	SBD	215	12.38

EXHIBIT "B"

SHEET 2 OF 2

CONVERGENCE ANGLE - 00°2'50.2"
SBD 215-008 C&D BRASS DISK
IN SLY SIDEWALK BASELINE
C/F - 05999348350

Q 9TH STREET

P.O.B.

BLOCK
19

N00°24'09"W

N0°26'16"W
25.146m (82.50')

N0°28'25"W
2.974m (9.76')

N0°10'14"W
2.930m (9.61')

17.591m
(57.71')

N89°34'19"E

17.600m
(57.74')

N89°34'18"E

12.573m
(41.25')

12.573m
(41.25')

12.573m
(41.25')

N0°25'45"W
2.952m (9.68')

N0°25'12"W
28.098m (92.19')

Q "I" STREET

EXISTING R/W

PARCEL No. 19162-1
EASEMENT

PARCEL MAP

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION



SCALE 1:600

EXHIBIT "C"
CONTRACTOR REQUIREMENTS
NINTH STREET OVERHEAD

1.01 General

- **1.01.01** The Contractor must cooperate with **BNSF RAILWAY COMPANY**, hereinafter referred to as "Railway" where work is over or under on or adjacent to Railway property and/or right-of-way, hereafter referred to as "Railway Property", during the demolition and reconstruction of the Ninth Street Overhead.
- **1.01.02** The Contractor must execute and deliver to the Railway duplicate copies of the Exhibit "C-1" Agreement, in the form attached hereto, obligating the Contractor to provide and maintain in full force and effect the insurance called for under Section 3 of said Exhibit "C-1". Questions regarding procurement of the Railroad Protective Liability Insurance should be directed to Rosa Martinez at Marsh, USA, 214-303-8519.
- **1.01.03** The Contractor must plan, schedule and conduct all work activities so as not to interfere with the movement of any trains on Railway Property.

1.01.04 The Contractor's right to enter Railway's Property is subject to the absolute right of Railway to cause the Contractor's work on Railway's Property to cease if, in the opinion of Railway, Contractor's activities create a hazard to Railway's Property, employees, and/or operations. Railway will have the right to stop construction work on the Project if any of the following events take place: (i) Contractor (or any of its subcontractors) performs the Project work in a manner contrary to the plans and specifications approved by Railway; (ii) Contractor (or any of its subcontractors), in Railway's opinion, prosecutes the Project work in a manner which is hazardous to Railway property, facilities or the safe and expeditious movement of railroad traffic; (iii) the insurance described in the attached Exhibit C-1 is canceled during the course of the Project; or (iv) STATE OF CALIFORNIA fails to pay Railway for the Temporary Construction License or the Easement pursuant to Article II, Section 1 of this Agreement. The work stoppage will continue until all necessary actions are taken by Contractor or its subcontractor to rectify the situation to the satisfaction of Railway's Division Engineer or until additional insurance has been delivered to and accepted by Railway. In the event of a breach of (i) this Agreement, (ii) the Temporary Construction License, or (iii) the Easement, Railway may immediately terminate the Temporary Construction License or the Easement. Any such work stoppage under this provision will not give rise to any liability on the part of Railway. Railway's right to stop the work is in addition to any other rights Railway may have including, but not limited to, actions or suits for damages or lost profits. In the event that Railway desires to stop construction work on the Project, Railway agrees to immediately notify the following individual in writing:

SANBAG Director of Freeway Construction
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410
Fax: (909) 388-2002.

- **1.01.05** The Contractor is responsible for determining and complying with all Federal, State and Local Governmental laws and regulations, including, but not limited to environmental laws and regulations (including but not limited to the Resource Conservation and Recovery Act, as amended; the Clean Water Act, the Oil Pollution Act, the Hazardous Materials Transportation Act, CERCLA), and health and safety laws and regulations. The Contractor hereby indemnifies, defends and holds harmless Railway for, from and against all fines or penalties imposed or assessed by Federal, State and Local Governmental Agencies against the Railway which arise out of Contractor's work under this Agreement.

1.01.06 The Contractor must notify the Director of Freeway Construction, **SAN BERNARDINO ASSOCIATED GOVERNMENTS**, hereinafter referred to as ("**SANBAG**") at 1170 W. 3rd Street, 2nd Floor, San Bernardino, CA. 92410, Fax No. (909) 388 2002 and Railway's Manager Public Projects, telephone number (909)-386-4472 at least thirty (30) calendar days before commencing any work on Railway Property. Contractor's notification to Railway, must refer to Railroad's file No. 026113F.

- **1.01.07** . For any bridge demolition and/or falsework above any tracks or any excavations located with any part of the excavations located within, whichever is greater, twenty-five (25) feet of the nearest track or intersecting a slope from the plane of the top of rail on a 2 horizontal to 1 vertical slope beginning at eleven (11) feet from centerline of the nearest track, both measured perpendicular to center line of track, the Contractor must furnish the Railway five sets of working drawings showing details of construction affecting Railway Property and tracks. The working drawing must include the proposed method of installation and removal of falsework, shoring or cribbing, not included in the contract plans and two sets of structural calculations of any falsework, shoring or cribbing. For all excavation and shoring submittal plans, the current "BNSF-UPRR Guidelines for Temporary Shoring" must be used for determining the design loading conditions to be used in shoring design, and all calculations and submittals must be in accordance with the current "BNSF-UPRR Guidelines for Temporary Shoring". All submittal drawings and calculations must be stamped by a registered professional engineer licensed to practice in the state the project is located. All calculations must take into consideration railway surcharge loading and must be designed to meet American Railway Engineering and Maintenance-of-Way Association (previously known as American Railway Engineering Association) Coopers E-80 live loading standard. All drawings and calculations must be stamped by a registered professional engineer licensed to practice in the state the project is located. The Contractor must not begin work until notified by the Railway that plans have been approved. The Contractor will be required to use lifting devices such as, cranes and/or winches to place or to remove any falsework over Railway's tracks. In no case will the Contractor be relieved of responsibility for results obtained by the implementation of said approved plans.
- **1.01.08** Subject to the movement of Railway's trains, Railway will cooperate with the Contractor such that the work may be handled and performed in an efficient manner. The Contractor will have no claim whatsoever for any type of damages or for extra or additional compensation in the event his work is delayed by the Railway.

1.02 Contractor Safety Orientation

- **1.02.01** No employee of the Contractor, its subcontractors, agents or invitees may enter Railway Property without first having completed Railway's Engineering Contractor Safety Orientation, found on the web site www.contractororientation.com. The Contractor must ensure that each of its employees, subcontractors, agents or invitees completes Railway's Engineering Contractor Safety Orientation through internet sessions before any work is performed on the Project. Additionally, the Contractor must ensure that each and every one of its employees, subcontractors, agents or invitees possesses a card certifying completion of the Railway Contractor Safety Orientation before entering Railway Property. The Contractor is responsible for the cost of the Railway Contractor Safety Orientation. The Contractor must renew the Railway Contractor Safety Orientation annually. Further clarification can be found on the web site or from the Railway's Representative.

1.03 Railway Requirements

- **1.03.01** The Contractor must take protective measures as are necessary to keep railway facilities, including track ballast, free of sand, debris, and other foreign objects and materials resulting from his operations. Any damage to railway facilities resulting from Contractor's operations will be repaired or replaced by Railway and the cost of such repairs or replacement must be paid for by SANBAG.
- **1.03.02** Blasting shall not be allowed on or adjacent to Railway property and/or right of way unless approved by the Railway.
- **1.03.03** The Contractor must abide by the following temporary clearances during construction:
 - 15'-0" Horizontally from centerline of nearest track
 - 21'-6" Vertically above top of rail
 - 27'-0" Vertically above top of rail for electric wires carrying less than 750 volts
 - 28'-0" Vertically above top of rail for electric wires carrying 750 volts to 15,000 volts
 - 30'-0" Vertically above top of rail for electric wires carrying 15,000 volts to 20,000 volts
 - 34'-0" Vertically above top of rail for electric wires carrying more than 20,000 volts

- **1.03.04** Upon completion of construction, the following clearances shall be maintained:
 - 27'-2" Horizontally from centerline of nearest track
 - 24'-4" Vertically above top of rail
- **1.03.05** Any infringement within State statutory clearances due to the Contractor's operations must be submitted to the Railway and to SANBAG and must not be undertaken until approved in writing by the Railway, and until SANBAG has obtained any necessary authorization from the State Regulatory Authority for the infringement. No extra compensation will be allowed in the event the Contractor's work is delayed pending Railway approval, and/or the State Regulatory Authority's approval.
- **1.03.06** In the case of impaired vertical clearance above top of rail, Railway will have the option of installing tell-tales or other protective devices Railway deems necessary for protection of Railway operations. The cost of tell-tales or protective devices will be borne by SANBAG.
- **1.03.07** The details of construction affecting the Railway's Property and tracks not included in the contract plans must be submitted to the Railway by SANBAG for approval before work is undertaken and this work must not be undertaken until approved by the Railway.
- **1.03.08** At other than public road crossings, the Contractor must not move any equipment or materials across Railway's tracks until permission has been obtained from the Railway. The Contractor must obtain a "Temporary Construction Crossing Agreement" from the Railway prior to moving his equipment or materials across the Railways tracks. The temporary crossing must be gated and locked at all times when not required for use by the Contractor. The temporary crossing for use of the Contractor will be constructed and at the completion of the project, removed at the expense of the Contractor.
- **1.03.09** Discharge, release or spill on the Railway Property of any hazardous substances, oil, petroleum, constituents, pollutants, contaminants, or any hazardous waste is prohibited and Contractor must immediately notify the Railway's Resource Operations Center at 1(800) 832-5452, of any discharge, release or spills in excess of a reportable quantity. Contractor must not allow Railway Property to become a treatment, storage or transfer facility as those terms are defined in the Resource Conservation and Recovery Act or any state analogue.
- **1.03.10** The Contractor upon completion of the work covered by this contract, must promptly remove from the Railway's Property all of Contractor's tools, equipment, implements and other materials, whether brought upon said property by said Contractor or any Subcontractor, employee or agent of Contractor or of any Subcontractor, and must cause Railway's Property to be left in a condition acceptable to the Railway's representative.

1.04 Contractor Roadway Worker on Track Safety Program and Safety Action Plan

- **1.04.01** Each Contractor that will perform work within 25 feet of the centerline of a track must develop and implement a Roadway Worker Protection/On Track Safety Program and work with Railway Project Representative to develop an on track safety strategy as described in the guidelines listed in the on track safety portion of the Safety Orientation. This Program must provide Roadway Worker protection/on track training for all employees of the Contractor, its subcontractors, agents or invitees. This training is reinforced at the job site through job safety briefings. Additionally, each Contractor must develop and implement the Safety Action Plan, as provided for on the web site www.contractororientation.com, which will be made available to Railway prior to commencement of any work on Railway Property. During the performance of work, the Contractor must audit its work activities. The Contractor must designate an on-site Project Supervisor who will serve as the contact person for the Railway and who will maintain a copy of the Safety Action Plan, safety audits, and Material Safety Datasheets (MSDS), at the job site.
- **1.04.02** Contractor shall have a background investigation performed on all of its employees, subcontractors and agents who will be performing any services on railroad property under this Agreement.

The background screening shall at a minimum meet the criteria defined by the e-RAILSAFE program outlined

at <http://www.e-railsafe.com> in addition to any other applicable regulatory requirements. The e-RAILSAFE program uses rail industry background screening standards.

Contractor shall obtain consent from all employees screened in compliance with the e-RAILSAFE program criteria to release completed background information to BNSF. Contractor shall be subject to periodic audit to ensure compliance.

Contractor shall not permit any of its employees, subcontractors or agents to perform services on property hereunder who are not approved under e-RAILSAFE program standards. Railroad shall have the right to deny entry onto its premises to any of Contractor's employees, subcontractors or agents who do not display the authorized identification badge issued by a background screening service meeting the standards set forth for the e-RAILSAFE program or who pose a threat, in Railroad's reasonable opinion, to the safety or security of Railroad's operations.

Contractors shall ensure its employees, subcontractors and agents are United States citizens or legally working in this country under a work VISA.

1.05 Facilities and Railway Flagger Services:

- **1.05.01** The Contractor must give Railway's Roadmaster (telephone 909 386 4061) a minimum of thirty (30) calendar days advance notice when flagging services will be required so that the Roadmaster can make appropriate arrangements (i.e., bulletin the flagger's position). If flagging services are scheduled in advance by the Contractor and it is subsequently determined by the parties hereto that such services are no longer necessary, the Contractor must give the Roadmaster five (5) working days advance notice so that appropriate arrangements can be made to abolish the position pursuant to union requirements.
- **1.05.02** Unless determined otherwise by Railway's Project Representative, Railway flagger will be required and furnished when Contractor's work activities are located over, under and/or within twenty-five (25) feet measured horizontally from centerline of the nearest track and when cranes or similar equipment positioned beyond 25-feet from the track centerline could foul the track in the event of tip over or other catastrophic occurrence, but not limited thereto for the following conditions:
 - **1.05.02a** When upon inspection by Railway's Representative, other conditions warrant.
 - **1.05.02b** When any excavation is performed below the bottom of tie elevation, if, in the opinion of Railway's representative, track or other Railway facilities may be subject to movement or settlement.
 - **1.05.02c** When work in any way interferes with the safe operation of trains at timetable speeds.
 - **1.05.02d** When any hazard is presented to Railway track, communications, signal, electrical, or other facilities either due to persons, material, equipment or blasting in the vicinity.
 - **1.05.02e** Special permission must be obtained from the Railway before moving heavy or cumbersome objects or equipment which might result in making the track impassable.
- **1.05.03** Flagging services will be performed by qualified Railway flaggers.
 - **1.05.03a** Flagging crew generally consists of one employee. However, additional personnel may be required to protect Railway Property and operations, if deemed necessary by the Railways Representative.
 - **1.05.03b** Each time a flagger is called, the minimum period for billing will be the eight (8) hour basic day.
 - **1.05.03c** The cost of flagger services provided by the Railway will be borne by SANBAG. The estimated cost for one (1) flagger is approximately between \$800.00 - \$1600.00 for an eight (8) hour basic day with time and one-half or double time for overtime, rest days and holidays. The estimated cost for each flagger includes vacation allowance, paid holidays, Railway and unemployment insurance, public liability and property damage insurance, health and welfare benefits, vehicle transportation, meals, lodging, radio equipment, supervision and other costs incidental to performing flagging services. Negotiations for Railway labor or collective bargaining

agreements and rate changes authorized by appropriate Federal authorities may increase actual or estimated flagging rates. The flagging rate in effect at the time of performance by the Contractor hereunder will be used to calculate the actual costs of flagging pursuant to this paragraph.

- **1.05.03d** The average train traffic on this route is 79 freight trains and 2 passenger trains per 24-hour period. Train timetable speeds are:

Westward: 50 MPH Passenger, 35 MPH Freight

Eastward: 60 MPH Passenger, 55 MPH Freight

1.06 Contractor General Safety Requirements

- **1.06.01** Work in the proximity of railway track(s) is potentially hazardous where movement of trains and equipment can occur at any time and in any direction. All work performed by contractors within 25 feet of any track must be in compliance with FRA Roadway Worker Protection Regulations.
- **1.06.02** Before beginning any task on Railway Property, a thorough job safety briefing must be conducted with all personnel involved with the task and repeated when the personnel or task changes. If the task is within 25 feet of any track, the job briefing must include the Railway's flagger, as applicable, and include the procedures the Contractor will use to protect its employees, subcontractors, agents or invitees from moving any equipment adjacent to or across any Railway track(s).
- **1.06.03** Workers must not work within 25 feet of the centerline of any track without an on track safety strategy approved by the Railway's Project Representative. When authority is provided, every contractor employee must know: (1) who the Railway flagger is, and how to contact the flagger, (2) limits of the authority, (3) the method of communication to stop and resume work, and (4) location of the designated places of safety. Persons or equipment entering flag/work limits that were not previously job briefed, must notify the flagger immediately, and be given a job briefing when working within 25 feet of the center line of track.
- **1.06.04** When Contractor employees are required to work on the Railway Property after normal working hours or on weekends, the Railroad's representative in charge of the project must be notified. A minimum of two employees must be present at all times.
- **1.06.05** Any employees, agents or invitees of Contractor or its subcontractors under suspicion of being under the influence of drugs or alcohol, or in the possession of same, will be removed from the Railway's Property and subsequently released to the custody of a representative of Contractor management. Future access to the Railway's Property by that employee will be denied.
- **1.06.06** Any damage to Railway Property, or any hazard noticed on passing trains must be reported immediately to the Railway's representative in charge of the project. Any vehicle or machine which may come in contact with track, signal equipment, or structure (bridge) and could result in a train derailment must be reported immediately to the Railway representative in charge of the project and to the Railway's Resource Operations Center at 1(800) 832-5452. Local emergency numbers are to be obtained from the Railway representative in charge of the project prior to the start of any work and must be posted at the job site.
- **1.06.07** For safety reasons, all persons are prohibited from having pocket knives, firearms or other deadly weapons in their possession while working on Railway's Property.
- **1.06.08** All personnel protective equipment (PPE) used on Railway Property must meet applicable OSHA and ANSI specifications. Current Railway personnel protective equipment requirements are listed on the web site, www.contractororientation.com, however, a partial list of the requirements include: a) safety glasses with permanently affixed side shields (no yellow lenses); b) hard hats c) safety shoe with: hardened toes, above-the-ankle lace-up and a defined heel; and d) high visibility retro-reflective work wear. The Railroad's representative in charge of the project is to be contacted regarding local specifications for meeting requirements relating to hi-visibility work wear. Hearing protection, fall protection, gloves, and respirators must be worn as required by State and Federal regulations. **(NOTE – Should there be a discrepancy between the information**

contained on the web site and the information in this paragraph, the web site will govern.)

- **1.06.09 THE CONTRACTOR MUST NOT PILE OR STORE ANY MATERIALS, MACHINERY OR EQUIPMENT CLOSER THAN 25'-0" TO THE CENTER LINE OF THE NEAREST RAILWAY TRACK. MATERIALS, MACHINERY OR EQUIPMENT MUST NOT BE STORED OR LEFT WITHIN 250 FEET OF ANY HIGHWAY/RAIL AT-GRADE CROSSINGS OR TEMPORARY CONSTRUCTION CROSSING, WHERE STORAGE OF THE SAME WILL OBSTRUCT THE VIEW OF A TRAIN APPROACHING THE CROSSING. PRIOR TO BEGINNING WORK, THE CONTRACTOR MUST ESTABLISH A STORAGE AREA WITH CONCURRENCE OF THE RAILROAD'S REPRESENTATIVE.**
- **1.06.10** Machines or vehicles must not be left unattended with the engine running. Parked machines or equipment must be in gear with brakes set and if equipped with blade, pan or bucket, they must be lowered to the ground. All machinery and equipment left unattended on Railway's Property must be left inoperable and secured against movement. (See internet Engineering Contractor Safety Orientation program for more detailed specifications)
- **1.06.11** Workers must not create and leave any conditions at the work site that would interfere with water drainage. Any work performed over water must meet all Federal, State and Local regulations.
- **1.06.12** All power line wires must be considered dangerous and of high voltage unless informed to the contrary by proper authority. For all power lines the minimum clearance between the lines and any part of the equipment or load must be; 200 KV or below - 15 feet; 200 to 350 KV - 20 feet; 350 to 500 KV - 25 feet; 500 to 750 KV - 35 feet; and 750 to 1000 KV - 45 feet. If capacity of the line is not known, a minimum clearance of 45 feet must be maintained. A person must be designated to observe clearance of the equipment and give a timely warning for all operations where it is difficult for an operator to maintain the desired clearance by visual means.

1.07 Excavation

- **1.07.01** Before excavating, the Contractor must determine whether any underground pipe lines, electric wires, or cables, including fiber optic cable systems are present and located within the Project work area. The Contractor must determine whether excavation on Railway's Property could cause damage to buried cables resulting in delay to Railway traffic and disruption of service to users. Delays and disruptions to service may cause business interruptions involving loss of revenue and profits. Before commencing excavation, the Contractor must contact BNSF's Field Engineering Representative (909 386 4079). All underground and overhead wires will be considered HIGH VOLTAGE and dangerous until verified with the company having ownership of the line. **It is the Contractor's responsibility to notify any other companies that have underground utilities in the area and arrange for the location of all underground utilities before excavating.**
- **1.07.02** The Contractor must cease all work and notify the Railway immediately before continuing excavation in the area if obstructions are encountered which do not appear on drawings. If the obstruction is a utility and the owner of the utility can be identified, then the Contractor must also notify the owner immediately. If there is any doubt about the location of underground cables or lines of any kind, no work must be performed until the exact location has been determined. There will be no exceptions to these instructions.
- **1.07.03** All excavations must be conducted in compliance with applicable OSHA regulations and, regardless of depth, must be shored where there is any danger to tracks, structures or personnel.
- **1.07.04** Any excavations, holes or trenches on the Railway's Property must be covered, guarded and/or protected when not being worked on. When leaving work site areas at night and over weekends, the areas must be secured and left in a condition that will ensure that Railway employees and other personnel who may be working or passing through the area are protected from all hazards. All excavations must be back filled as soon as possible.

1.08 Hazardous Waste, Substances and Material Reporting

- **1.08.01** If Contractor discovers any hazardous waste, hazardous substance, petroleum or other deleterious material, including but not limited to any non-containerized commodity or material, on or adjacent to Railway's Property, in or near any surface water, swamp, wetlands or waterways, while performing any work under this Agreement, Contractor must immediately: (a) notify the Railway's Resource Operations Center at 1(800) 832-5452, of such discovery: (b) take safeguards necessary to protect its employees, subcontractors, agents and/or third parties: and (c) exercise due care with respect to the release, including the taking of any appropriate measure to minimize the impact of such release.

1.09 Personal Injury Reporting

- **1.09.01** The Railway is required to report certain injuries as a part of compliance with Federal Railroad Administration (FRA) reporting requirements. Any personal injury sustained by an employee of the Contractor, subcontractor or Contractor's invitees while on the Railway's Property must be reported immediately (by phone mail if unable to contact in person) to the Railway's representative in charge of the project. The Non-Employee Personal Injury Data Collection Form contained herein is to be completed and sent by Fax to the Railway at 1(817) 352-7595 and to the Railway's Project Representative no later than the close of shift on the date of the injury.

NON-EMPLOYEE PERSONAL INJURY DATA COLLECTION

INFORMATION REQUIRED TO BE COLLECTED PURSUANT TO FEDERAL REGULATION. IT SHOULD BE USED FOR COMPLIANCE WITH FEDERAL REGULATIONS ONLY AND IS NOT INTENDED TO PRESUME ACCEPTANCE OF RESPONSIBILITY OR LIABILITY.

1. Accident City/St _____ 2. Date: _____ Time: _____
County: _____ 3. Temperature: _____ 4. Weather _____
(if non-Railway location)
5. Social Security # _____
6. Name (last, first, mi) _____
7. Address: Street: _____ City: _____ St. _____ Zip: _____
8. Date of Birth: _____ and/or Age _____ Gender: _____
(if available)
9. (a) Injury: _____ (b) Body Part: _____
(i.e. (a) Laceration (b) Hand)
11. Description of Accident (To include location, action, result, etc.): _____
12. Treatment:
 ? First Aid Only
 ? Required Medical Treatment
 ? Other Medical Treatment
13. Dr. Name _____ 30. Date: _____
14. Dr. Address:
 Street: _____ City: _____ St: _____ Zip: _____
15. Hospital Name: _____
16. Hospital Address:
 Street: _____ City: _____ St: _____ Zip: _____
17. Diagnosis: _____

**FAX TO
RAILWAY AT (817) 352-7595
AND COPY TO
RAILWAY ROADMASTER FAX: 909-386-4843**

OVERHEAD EXHIBIT "C -1"

**Agreement
Between
BNSF RAILWAY COMPANY
and the
CONTRACTOR**

**BNSF RAILWAY COMPANY
Attention: Manager Public Projects**

**Railway File: 026113F
Agency Project: Ninth St. Overhead**

Gentlemen:

The undersigned (hereinafter called, the "Contractor"), has entered into a contract (the "Contract") dated _____, 200_, with **SAN BERNARDINO ASSOCIATED GOVERNMENTS** for the performance of certain work in connection with the following project: demolish and reconstruct the Ninth Street Overhead, in San Bernardino, CA. Performance of such work will necessarily require contractor to enter BNSF RAILWAY COMPANY ("Railway") right of way and property ("Railway Property"). The Contract provides that no work will be commenced within Railway Property until the Contractor employed in connection with said work for **SAN BERNARDINO ASSOCIATED GOVERNMENTS** (i) executes and delivers to Railway an Agreement in the form hereof, and (ii) provides insurance of the coverage and limits specified in such Agreement and Section 3 herein. If this Agreement is executed by a party who is not the Owner, General Partner, President or Vice President of Contractor, Contractor must furnish evidence to Railway certifying that the signatory is empowered to execute this Agreement on behalf of Contractor.

Accordingly, in consideration of Railway granting permission to Contractor to enter upon Railway Property and as an inducement for such entry, Contractor, effective on the date of the Contract, has agreed and does hereby agree with Railway as follows:

Section 1. RELEASE OF LIABILITY AND INDEMNITY

Contractor hereby waives, releases, indemnifies, defends and holds harmless Railway for all judgments, awards, claims, demands, and expenses (including attorneys' fees), for injury or death to all persons, including Railway's and Contractor's officers and employees, and for loss and damage to property belonging to any person, arising in any manner from Contractor's or any of Contractor's subcontractors' acts or omissions or any work performed on or about Railway's property or right-of-way. **THE LIABILITY ASSUMED BY CONTRACTOR WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DESTRUCTION, DAMAGE, DEATH, OR INJURY WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF RAILWAY, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, UNLESS SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE WILLFUL MISCONDUCT OR SOLE NEGLIGENCE OF RAILWAY.**

THE INDEMNIFICATION OBLIGATION ASSUMED BY CONTRACTOR INCLUDES ANY CLAIMS, SUITS OR JUDGMENTS BROUGHT AGAINST RAILWAY UNDER THE FEDERAL EMPLOYEE'S LIABILITY ACT, INCLUDING CLAIMS FOR STRICT LIABILITY UNDER THE SAFETY APPLIANCE ACT OR THE LOCOMOTIVE INSPECTION ACT, WHENEVER SO CLAIMED.

Contractor further agrees, at its expense, in the name and on behalf of Railway, that it will adjust and settle all claims made against Railway, and will, at Railway's discretion, appear and defend any suits or actions of law or in equity brought against Railway on any claim or cause of action arising or growing out of or in any manner connected with any liability assumed by Contractor under this Agreement for which Railway is liable or is alleged to be liable. Railway will give notice to Contractor, in writing, of the receipt or dependency of such claims and thereupon Contractor must proceed to adjust and handle to a conclusion such claims, and in the event of a suit being brought against Railway, Railway may forward summons and complaint or other process in connection therewith to Contractor, and Contractor, at Railway's discretion, must defend, adjust, or settle such suits and protect, indemnify, and save harmless Railway from and against all damages, judgments, decrees, attorney's fees, costs, and expenses growing out of or resulting from or incident to any such claims or suits.

In addition to any other provision of this Agreement, in the event that all or any portion of this Article shall be deemed to be inapplicable for any reason, including without limitation as a result of a decision of an applicable court, legislative enactment or regulatory order, the parties agree that this Article shall be interpreted as requiring Contractor to indemnify Railroad to the fullest extent permitted by applicable law. **THROUGH THIS AGREEMENT THE PARTIES EXPRESSLY INTEND FOR CONTRACTOR TO INDEMNIFY RAILROAD FOR RAILROAD'S ACTS OF NEGLIGENCE.**

It is mutually understood and agreed that the assumption of liabilities and indemnification provided for in this Agreement survive any termination of this Agreement.

Section 2. TERM

This Agreement is effective from the date of the Contract until (i) the completion of the project set forth herein, and (ii) full and complete payment to Railway of any and all sums or other amounts owing and due hereunder.

Section 3. INSURANCE

Contractor must, at its sole cost and expense, procure and maintain during the life of this Agreement the following insurance coverage:

A. Commercial General Liability insurance. This insurance must contain broad form contractual liability with a combined single limit of a minimum of \$5,000,000 each occurrence and an aggregate limit of at least \$10,000,000. Coverage must be purchased on a post 1998 ISO occurrence form or equivalent and include coverage for, but not limit to the following:

- ◆ Bodily Injury and Property Damage
- ◆ Personal Injury and Advertising Injury
- ◆ Fire legal liability
- ◆ Products and completed operations

This policy must also contain the following endorsements, which must be indicated on the certificate of insurance:

- ◆ It is agreed that any workers' compensation exclusion does not apply to **Railroad** payments related to the Federal Employers Liability Act or a **Railroad** Wage Continuation Program or similar programs and any payments made are deemed not to be either payments made or obligations assumed under any Workers Compensation, disability benefits, or unemployment compensation law or similar law.
- ◆ The definition of insured contract must be amended to remove any exclusion or other limitation for any work being done within 50 feet of railroad property.
- ◆ Any exclusions related to the explosion, collapse and underground hazards must be removed.

No other endorsements limiting coverage as respects obligations under this Agreement may be included on the policy.

B. Business Automobile Insurance. This insurance must contain a combined single limit of at least \$1,000,000 per occurrence, and include coverage for, but not limited to the following:

- ◆ Bodily injury and property damage
- ◆ Any and all vehicles owned, used or hired

C. Workers Compensation and Employers Liability insurance including coverage for, but not limited to:

- ◆ California's statutory liability under the worker's compensation laws of the state(s) in which the work is to be performed. If optional under State law, the insurance must cover all employees anyway.
- ◆ Employers' Liability (Part B) with limits of at least \$500,000 each accident, \$500,000 by disease policy limit, \$500,000 by disease each employee.

D. Railroad Protective Liability insurance naming only the **Railroad** as the Insured with coverage of at least \$5,000,000 per occurrence and \$10,000,000 in the aggregate. The policy Must be issued on a standard ISO form CG 00 35 10 93 and include the following:

- ◆ Endorsed to include the Pollution Exclusion Amendment (ISO form CG 28 31 10 93)
- ◆ Endorsed to include the Limited Seepage and Pollution Endorsement.
- ◆ Endorsed to remove any exclusion for punitive damages.
- ◆ No other endorsements restricting coverage may be added.
- ◆ The original policy must be provided to the **Railroad** prior to performing any work or services under this Agreement

Other Requirements:

All policies (applying to coverage listed above) must not contain an exclusion for punitive damages and certificates of insurance must reflect that no exclusion exists.

Contractor agrees to waive its right of recovery against **Railroad** for all claims and suits against **Railroad**. In addition, its insurers, through the terms of the policy or policy endorsement, waive their right of subrogation against **Railroad** for all claims and suits. The certificate of insurance must reflect the waiver of subrogation endorsement. Contractor further waives its right of recovery, and its insurers also waive their right of subrogation against **Railroad** for loss of its owned or leased property or property under contractor's care, custody or control.

Contractor's insurance policies through policy endorsement, must include wording which states that the policy is primary and non-contributing with respect to any insurance carried by **Railroad**. The certificate of insurance must reflect that the above wording is included in evidenced policies.

All policy(ies) required above (excluding Workers Compensation and if applicable, Railroad Protective) must include a severability of interest endorsement and **Railroad** must be named as an additional insured with respect to work performed under this agreement. Severability of interest and naming **Railroad** as additional insured must be indicated on the certificate of insurance.

Contractor is not allowed to self-insure without the prior written consent of **Railroad**. If granted by **Railroad**, any deductible, self-insured retention or other financial responsibility for claims must be covered directly by contractor in lieu of insurance. Any and all **Railroad** liabilities that would otherwise, in accordance with the provisions of this **Agreement**, be covered by contractor's insurance will be covered as if contractor elected not to include a deductible, self-insured retention or other financial responsibility for claims.

Prior to commencing the Work, contractor must furnish to **Railroad** an acceptable certificate(s) of insurance including an original signature of the authorized representative evidencing the required coverage, endorsements, and amendments and referencing the contract audit/folder number if available. The policy(ies) must contain a provision that obligates the insurance company(ies) issuing such policy(ies) to notify **Railroad** in writing at least 30 days prior to any cancellation, non-renewal, substitution or material alteration. This cancellation

provision must be indicated on the certificate of insurance. Upon request from **Railroad**, a certified duplicate original of any required policy must be furnished. Contractor should send the certificate(s) to the following address:

IDS
PO Box 12010-BN
Hemet, CA 92546-8010
Fax number: 951-766-2299
Email: customerservice@certsonline.com

Any insurance policy must be written by a reputable insurance company acceptable to **Railroad** or with a current Best's Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the service is to be provide.

Contractor represents that this **Agreement** has been thoroughly reviewed by contractor's insurance agent(s)/broker(s), who have been instructed by contractor to procure the insurance coverage required by this **Agreement**. Allocated Loss Expense must be in addition to all policy limits for coverages referenced above. Not more frequently than once every five years, **Railroad** may reasonably modify the required insurance coverage to reflect then-current risk management practices in the railroad industry and underwriting practices in the insurance industry.

If any portion of the operation is to be subcontracted by contractor, contractor must require that the subcontractor provide and maintain the insurance coverages set forth herein, naming **Railroad** as an additional insured, and requiring that the subcontractor release, defend and indemnify **Railroad** to the same extent and under the same terms and conditions as contractor is required to release, defend and indemnify **Railroad** herein.

Failure to provide evidence as required by this section will entitle, but not require, **Railroad** to terminate this **Agreement** immediately. Acceptance of a certificate that does not comply with this section will not operate as a waiver of contractor's obligations hereunder.

The fact that insurance (including, without limitation, self-insurance) is obtained by contractor will not be deemed to release or diminish the liability of contractor including, without limitation, liability under the indemnity provisions of this **Agreement**. Damages recoverable by **Railroad** will not be limited by the amount of the required insurance coverage.

For purposes of this section, **Railroad** means "Burlington Northern Santa Fe Corporation", "BNSF RAILWAY COMPANY" and the subsidiaries, successors, assigns and affiliates of each.

Section 4. EXHIBIT "C" CONTRACTOR REQUIREMENTS

The Contractor must observe and comply with the provisions, obligations, requirements and limitations contained in the Contract and the Contractor Requirements set forth on Exhibit "C" attached to the Contract and this Agreement, including, but not be limited to, payment of all costs incurred for any damages to Railway roadbed, tracks, and/or appurtenances thereto, resulting from use, occupancy, or presence of its employees, representatives, or agents or subcontractors on or about the construction site.

Section 5. TRAIN DELAY

Contractor is responsible for and hereby indemnifies and holds harmless Railway (including its affiliated railway companies, and its tenants) for, from and against all damages arising from any unscheduled delay to a freight or passenger train which affects Railway's ability to fully utilize its equipment and to meet customer service and contract obligations. Contractor will be billed, as further provided below, for the economic losses arising from loss of use of equipment, contractual loss of incentive pay and bonuses and contractual penalties resulting from train delays, whether caused by Contractor, or subcontractors, or by the Railway performing work under this Agreement. Railway agrees that it will not perform any act to unnecessarily cause train delay.

For loss of use of equipment, Contractor will be billed the current freight train hour rate per train as determined from Railway's records. Any disruption to train traffic may cause delays to multiple trains at the same time for the same period.

Additionally, the parties acknowledge that passenger, U.S. mail trains and certain other grain, intermodal, coal and freight trains operate under incentive/penalty contracts between Railway and its customer(s). Under these arrangements, if Railway does not meet its contract service commitments, Railway may suffer loss of performance or incentive pay and/or be subject to penalty payments. Contractor is responsible for any train performance and incentive penalties or other contractual economic losses actually incurred by Railway which are attributable to a train delay caused by Contractor or its subcontractors.

The contractual relationship between Railway and its customers is proprietary and confidential. In the event of a train delay covered by this Agreement, Railway will share information relevant to any train delay to the extent consistent with Railway confidentiality obligations. Damages for train delay for certain trains may be as high as \$50,000.00 (\$382.20 per hour) per incident. **THE RATE THEN IN EFFECT AT THE TIME OF PERFORMANCE BY THE CONTRACTOR HEREUNDER WILL BE USED TO CALCULATE THE ACTUAL COSTS OF TRAIN DELAY PURSUANT TO THIS AGREEMENT.**

Contractor and its subcontractors must give Railway's representative 909 386 4079 eight (8) weeks advance notice of the times and dates for proposed work windows. Railway and Contractor will establish mutually agreeable work windows for the project. Railway has the right at any time to revise or change the work windows due to train operations or service obligations. Railway will not be responsible for any additional costs or expenses resulting from a change in work windows. Additional costs or expenses resulting from a change in work windows shall be accounted for in Contractor's expenses for the project.

Contractor and subcontractors must plan, schedule, coordinate and conduct all Contractor's work so as to not cause any delays to any trains.

Kindly acknowledge receipt of this letter by signing and returning to the Railway two original copies of this letter, which, upon execution by Railway, will constitute an Agreement between us.

(Contractor)

BNSF Railway Company

By: _____
Printed Name: _____
Title: _____

By: _____
Name: **Melvin Thomas**
Manager Public Projects

Contact Person: _____
Address _____

City: _____ State: _____ Zip: _____
Fax: _____
Phone: _____
E-mail: _____

Accepted and effective this _____ day of 20__.

EXHIBIT D

***** MAINTAIN PROPRIETARY CONFIDENTIALITY *****

BNSF RAILWAY COMPANY
COMPANY ESTIMATE FOR
SANBAG

LOCATION BASELINE DETAILS OF ESTIMATE PLAN ITEM: 000136814 VERSION: 1

PURPOSE, JUSTIFICATION AND DESCRIPTION

BNSF TO PROVIDE FLAGGING AND INSPECTION TO WIDEN 9TH ST BRIDGE/215 FREEWAY
100% BILLABLE TO SANBAG
RDM JIMMY CAPPS DE ADAM RICHARDSON

MAINTAIN PROPRIETARY CONFIDENTIALITY

THE PHYSICAL LIMITS OF THIS PROJECT ARE DESCRIBED BY LINE SEGMENT, MILE POST RANGES, AND IN SOME CASES TRACK NUMBER. THIS IS THE PRIMARY AREA FOR THE PROJECT. THERE WILL BE CASES WHERE WORK MAY OCCUR BEYOND THE DEFINED LIMITS.

PROJECTS THAT INCLUDE SIGNAL, ELECTRICAL, OR TELECOMMUNICATION EQUIPMENT MAY REQUIRE ACTIVITY BEYOND THESE DEFINED TRACK LIMITS. ALL OR PORTIONS OF SOME PROJECTS MAY OCCUR IN AREAS WHERE NO MILEPOST SIGNS EXIST SUCH AS YARDS.

THIS ESTIMATE IS GOOD FOR 90 DAYS. THEREAFTER THE ESTIMATE IS SUBJECT TO CHANGE IN COST FOR LABOR, MATERIAL, AND OVERHEAD.

DESCRIPTION	QUANTITY U/M	COST	TOTAL \$

LABOR			

FLAGGING - OTHER R.O.W.- CAP	4800.0 MH	115,696	
PAYROLL ASSOCIATED COSTS		50,906	
DA OVERHEADS		237,176	
TOTAL LABOR COST		403,778	403,778

MATERIAL			

TOTAL MATERIAL COST		0	0

OTHER			

CONTRACT PREPARATION	1.0 LS	20,000	
INSPECTION / COORDINATION	80.0 DAY	48,000	
TOTAL OTHER ITEMS COST		68,000	68,000
PROJECT SUBTOTAL			471,778
CONTINGENCIES			9,435
BILL PREPARATION FEE			0
GROSS PROJECT COST			481,213
LESS COST PAID BY BNSF			0
TOTAL BILLABLE COST			481,213

Exhibit E



Melvin Thomas	BNSF Railway Company
<i>Manager Public Projects</i>	740 East Carnegie Drive
<i>Engineering Services</i>	San Bernardino, CA 92408
	Office: 909-386-4472
	Fax: 909-386-4479
	Cell: 909-831-8199
	Email: melvin.thomas@bnsf.com

Date:

Garry Cohoe
Director of Freeway Construction
San Bernardino Associated Governments
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410

Re: Final Approval of Plans and Specifications dated _____
_____ by (consultant) (**hereinafter called, the "Plans and Specifications"**)

Dear Mr. Cohoe:

This letter serves as BNSF RAILWAY COMPANY'S ("BNSF") final written approval of that portion of the Plans and Specifications covering the Project's concept for reconstruction of the Ninth Street Overhead, U.S. D.O.T. No. 026113F involving the vertical and horizontal clearances from the bridge soffit and the face of the columns, piers, and/or abutments which ever be the case and the location of the piers and abutments that will be constructed adjacent or on BNSF's Rail Corridor. This final written approval is given to SAN BERNARDINO ASSOCIATED GOVERNMENTS ("SANBAG") pursuant to Article III, Section 1 of that certain Overhead Agreement between BNSF, SANBAG, and the STATE of CALIFORNIA which this Exhibit E is attached to and made a part thereof.

If the Plans and Specifications are revised by SANBAG subsequent to the date set forth above, this letter shall no longer serve as final written approval of the Plans and Specifications and SANBAG must resubmit said Plans and Specifications to BNSF for final written approval.

It is understood that the approvals contained in this letter do not cover, the approvals of plans and specifications for any falsework, shoring, and demolition that may be subsequently submitted to BNSF by SANBAG or its contractor for approval.

Respectfully,

Melvin Thomas

Manager Public Projects
BNSF Railway

Form Approved by VP-Law

Form 0105 Overheads Rev. 11/04/07

Exhibit F

BNSF Bridge Requirements

BRIDGE DESIGN, PLANS & SPECIFICATIONS:

Except for the design of temporary falsework and shoring, BNSF review of the Structure plans will be limited to the vertical and horizontal clearances, sight distance for existing train signals, foundation dimensions and drainage characteristics as they relate to existing and future tracks. BNSF will not review structural design calculations for the permanent Structure unless a member or members are influenced by railroad live loads.

Temporary falsework and shoring plans and calculations must be reviewed and approved by BNSF prior to beginning construction. SANBAG shall perform an independent review of the design calculations for temporary falsework and shoring prior to submitting them to BNSF for approval. Temporary construction clearances must be no less than 15 feet measured horizontally from the centerline of the nearest track and 21 feet-6inches measured vertically from the top of rail of the most elevated track to the bottom of lowest temporary falsework member. State regulatory agencies may have more restrictive requirements for temporary railroad clearances.

For the permanent Structure, SANBAG will submit plans showing the least horizontal distance from the centerline of existing and future tracks to the face of the nearest member of the proposed Structure. The location of the least horizontal distance must be accurately described such that BNSF can determine where it will occur in both the horizontal and vertical plane. The general policy of the Burlington Northern and Santa Fe (BNSF) with regard to bridge and related crash wall construction is to follow the current recommendations of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Current AREMA recommended practice in Manual for Railway Engineering Chapter 8 (Art. 2.1.5.1). Crash Walls will not be required for the construction of the Ninth Street Overpass Project, U.S. D.O.T. No. 26113F, as provided for in Article I of this Agreement.

For the permanent Structure, SANBAG will submit plans showing the least vertical clearance from top of the most elevated rail of existing and future tracks to the lowest point of the proposed Structure. Prior to beginning construction of the permanent Structure, the top of rail elevations should be checked and verified that they have not changed from the assumed elevations utilized for the design of the bridge.

Prior to issuing any invitation to bid on construction of the Structure, SANBAG should conduct a pre-bid meeting where prospective Contractors have the opportunity to communicate with BNSF personnel regarding site specific train speeds, train density, and general safety requirements for men and equipment working near live tracks. Any invitation to bid and specifications for the Structure must be submitted to BNSF for review and approval prior to letting of bids for the Project.

BRIDGE CONSTRUCTION:

After awarding the bid, but prior to the Contractor entering BNSF's railroad corridor or property, SANBAG should conduct a pre-construction meeting with BNSF personnel in attendance to reiterate the safety requirements of construction activity adjacent to live tracks.

During construction, BNSF may require an independent engineering inspector to be present during certain critical activities of the Project, including but not limited to: driving foundation piles, erecting falsework, construction of shoring and retaining walls, placing concrete, placing soil backfill and compaction processes. SANBAG shall reimburse BNSF for all costs of supplemental inspection services.

Within 90 days of the conclusion of the Project and final acceptance by BNSF, SANBAG will provide BNSF with a complete electronic set of the bridge plans. BNSF will also accept a marked up paper copy of the bridge plans

labeled "As Built". The marked up paper copy of the plans will reflect any and all deviations from the original plans that occurred during construction. The electronic set of the bridge plans will be submitted in Micro Station *.dgn electronic format (preferred) or AutoCAD *.dwg format. Electronic plans are to be submitted in the original format used for CAD plan preparation and not converted to another format prior to submission. The "As Built" plans shall show actual measured "as constructed" clearances shall be shown as well as depth, size and location of all foundation components. The plans shall show dimensioned locations of existing and relocated utilities. It is understood that BNSF prefers to receive the "As Built" plans in an electronic format.

BRIDGE MAINTENANCE:

STATE will be responsible for maintenance and repair of the Structure including the earth retention components, embankment slopes, erosion control, surface drainage, fencing, deck drains, landscaping, paint, walkways, handrails, lighting, and other improvements associated with the Project.

Fencing and other pedestrian access controls within BNSF's rail corridor and incorporated into the Project shall be designed and maintained by SANBAG through construction. Trespasser control shall be the responsibility of SANBAG through construction. Graffiti removal will be the responsibility of STATE.

BRIDGE INSPECTION:

STATE will conduct annual routine structural inspections. In the event of an earthquake, fire, flood, damage from vehicular impacts or other emergent situations, STATE will provide an immediate inspection by qualified personnel and notify BNSF of damage that may affect safe passage of trains. If necessary STATE will embargo weights or provide lane closures or other such measures to protect the structural integrity of the Structure such that there can be continuous safe passage of trains until repairs are made.

BRIDGE ALTERATIONS:

Except as provided otherwise by this Agreement, there will be no alterations made to the Structure that will alter the railroad vertical or horizontal clearances provided by the original design

It is expressly understood by STATE that the right to install utilities is restricted to the placement of underground utilities beneath BNSF's tracks located a minimum of fifty (50) feet from abutments, piers, piles, or footings. Under no circumstances will utilities be allowed to hang from the Structure, unless approved by BNSF. All utility crossings within the limits of BNSF's Rail Corridor will be covered by separate agreements between BNSF and each of the owners of the utilities.

EXHIBIT G

INSTRUCTIONS FOR PREPARATION OF DEMOLITION PLANS FOR STRUCTURES OVER THE BURLINGTON NORTHERN SANTA FE RAILROAD

SECTION I. GENERAL

A. The Contractor will abide by and adhere to the requirements of the Exhibit C. Should there be a discrepancy between the requirements contained in the Exhibit C and this Exhibit G, the Exhibit C will govern.

B. The Contractor's work shall in no way impede train operations.

1. The term "Overhead" refers to the structure to be demolished.
2. The words "demolition" and "removal" will be used interchangeably in this Exhibit G.
3. The term "Railroad" refers to the Railroad's Engineer or designated representative.

C. Safety takes precedence over productivity. The Contractor shall be responsible for planning and executing all procedures necessary to remove the Overhead in a safe, predictable manner. All employees of the Contractor and Subcontractors must be Safety Trained. Refer to <http://www.contractororientation.com>.

D. The Contractor shall develop a Demolition Plan ONLY AFTER CONSULTING WITH THE RAILROAD TO GET AN ESTIMATE OF THE RANGE OF WORK WINDOWS THAT MIGHT NORMALLY BE AVAILABLE FOR THE JOB SITE.

1. A Work Window is the elapsed time between approaching trains.
2. An estimate of the availability of Work Windows can be used by the Contractor to design a Demolition Plan. The estimated Work Window is a guideline and not to be considered as a guarantee for available working time.
3. Work Windows will vary significantly, depending on the location. Low speed - low train density tracks have predictable Work Windows. The opposite is true for high density- high speed main tracks. The Railroad shall, at its sole discretion, furnish a range of Work Windows that might be expected at a specific location under normal train traffic conditions.
4. The Contractor shall plan the demolition procedures based upon the smallest ESTIMATED Work Window. Do not assume the longest Work Window will be available on any given day. Do not assume the same Work Windows will be available from one day to the next.
5. The Contractor will give BNSF's Project Engineer at telephone number 909-386-4079, eight (8) weeks advance notice of the proposed times and dates for Work Windows. BNSF and the contractor will establish mutually agreeable Work Windows for the Project. Any request for Work Windows with less than eight (8) weeks advance notice will have a reduced probability of approval. BNSF has the right at any time to revise or change the Work Windows, due to train operations or service obligations. BNSF will not be responsible for any additional costs and expenses resulting from a change in Work Windows. Additional costs and expenses resulting from a change in Work Windows shall be accounted for in the contractor's expenses for the Project.

E. The Railroad's tracks and property shall be protected at all times.

1. Removal procedures shall take into account SEVERE WEATHER CONDITIONS, including high winds, heavy rains and snowfall accumulation.

2. The contractor shall ensure that all areas adjacent to active tracks shall remain free from hazards.
 - a) Trainmen must have an unobstructed walkway available parallel to all active tracks pursuant to the California Public Utilities Commission General Order 118.
 - b) All open excavations shall be protected with fencing.
 - c) Do not store materials or equipment within 25 feet of the centerline of an active track.
3. Protect the project area from vandalism.
 - a) Do not leave debris where vandals could place it on the tracks or drop it onto the tracks from the Overhead.
 - b) Secure all heavy equipment from potential movement by vandals.
 - c) Do not store flammable materials on railroad right of way. Remove combustible waste materials daily. Do not store fuel or other flammable liquids on railroad right of way.

F. All demolition materials and scrap shall be disposed of outside the Railroad right-of-way at no expense to the Railroad. At the conclusion of the project, the area must be left in a clean and graded condition to the exclusive satisfaction of the Railroad.

G. No work is allowed within 25 feet of the nearest track unless protected by a Railroad Flagger. Refer to Exhibit C Section 1.05, Protection of Railway Facilities and Railway Flagger Services for additional flagging requirements.

H. The staged demolition of any portion of the Overhead over or adjacent to operational tracks will not jeopardize the stability of other parts of the Overhead awaiting demolition.

1. Where multiple tracks are involved, the Demolition Plan should be engineered as much as practical such that no more than one track is rendered impassable at any given moment.

I. No blasting will be permitted on Railroad's right-of-way.

SECTION II. DEMOLITION PLAN

A. The Contractor shall submit a detailed Demolition Plan to the Railroad. The Demolition Plan shall encompass the following:

1. Provide a scale drawing showing the plan view, elevation and location of the Overhead and locations of any access roads needed on railroad right of way to access the job site. The as-built drawings may be used for the submittal provided the removal steps are clearly marked and legible.
2. Indicate the position of all railroad tracks below the bridge. Identify each track as mainline, siding, spur, etc. Identify locations where temporary crossings will be installed to cross equipment over each track.
3. List in sequential order, all procedures necessary to remove the bridge in a safe and controlled manner. Include step by step details of each sequence and the elapsed time required to execute the sequence. The Demolition Plan must specify which, if any, sequences will render a track impassable to trains during execution of the sequence. If more than one track is adjacent to the work area, specify which tracks will be impassable during execution of each sequence.
4. Include text, drawings or photos to communicate the types of equipment that will be utilized. Include diagrams showing the position of the equipment in relation to the tracks. Where cranes are to be used, furnish the lifting capacities of the crane at the anticipated radius and the weights of components to be removed.

5. For every sequence, specify the minimum horizontal clearance from centerline of track and the minimum vertical clearance above top of rail for equipment, falsework, rubble shields and temporary supports. If a crane is to be utilized, include clearances for the backswing radius of the crane counterweight and the position of the outriggers. Refer to the Frame Protection Details drawings, three sheets, attached hereto and made a part hereof, for the minimum allowable vertical and horizontal clearances.

6. If the Demolition Plan includes concrete demolition, include the details of rubble control such as maximum anticipated size of rubble, drop distance, shield size and shield position.

7. The Demolition Plan will indicate locations and types of temporary supports, shoring, cables or bracing required.

a) Excavations and shoring design shall be according to the attached "GENERAL SHORING REQUIREMENTS" drawings, two pages, attached hereto and made a part hereof.

b) Falsework shall be designed according to the State of California, Department of Transportation FALSEWORK MANUAL available at this Web Site:

[http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/FalseworkManual\(Rev32\).pdf](http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/FalseworkManual(Rev32).pdf).

c) Plans shall conform to the appropriate Federal, State and local regulations and building codes.

8. If any temporary supports interfere with the natural drainage along the Railroad right-of-way, a temporary drainage diversion plan shall be included in the Demolition Plan. The drainage plan shall route all surface water away from the railroad tracks.

a) Do not block drainage in side ditches with debris.

b) Do not place footing blocks in drainage ditches.

c) Surface runoff must be diverted away from the footing block excavations to avoid saturation of the underlying supporting soils.

9. The Demolition Plan shall include details, limits, and locations of protective shields or other measures designed to protect the rails, ties and ballast from falling debris. Include details of catchment apparatus necessary to protect the tracks from rolling debris that may fall onto side slopes. Include the design load for the shields for both the maximum static load and the maximum anticipated impact loads from falling debris. Specify the type of equipment that will be utilized to remove the debris and shields from operational tracks.

10. Protection of the track ballast section must be provided to avoid contamination of the rock with fine dust and mud produced during demolition activities. Filter fabric or some other effective means to prevent ballast contamination should be incorporated into the Demolition Plan.

11. All overhead and underground utilities in the area affected by removal of the bridge shall be located on the drawings, including any fiber optic, railroad signal, and communication lines.

12. Indicate the limits of demolition of substructures, including depths and dimensions of excavations that might be necessary to demolish buried footings.

13. The Demolition Plan should include details of planned on-site fire suppression.

B. The Contractor shall submit to the Railroad: three (3) complete sets of the Demolition Plan to BNSF's Assistant Director Structural Engineering for review and comments. The Demolition Plan should be sent in PDF format for files up to (2) megabytes by email attachment to: Donald.Lozano@bnsf.com. Should the Demolition Plan exceed a two (2) megabyte PDF file, a CD of the plans and specifications should be sent via overnight mail service to mailing address , 4515 Kansas Avenue, Kansas City, KS 66106.

1. The Plan shall be sealed by a Civil or Structural Engineer registered in the state where the proposed demolition will take place.
2. A minimum of four (4) weeks shall be expected for the Railroad's review after the complete submittal is received.
3. No removal operations will be permitted over the Railroad right of way until the submitted material has been reviewed and approved.

C. Approval and/or comments furnished by the Railroad in the course of review of the Contractor's Demolition Plan will not relieve the Contractor of the ultimate responsibility for the safe and secure demolition of the Overhead.

SECTION III. PROCEDURE

A. The Demolition Plan must be executed such that stability is continuously maintained for the standing portions of the Overhead over all tracks.

1. All members of the Overhead being demolished must be continuously supported to resist high winds, including wind buffets and suction forces generated by high speed trains.

B. Prior to proceeding with bridge removal, the sealing Civil or Structural Engineer, or his authorized representative, shall inspect all components of the temporary support shoring, including temporary bracing and protective coverings, insuring conformity with the working drawings.

1. The sealing Engineer shall certify in writing to the Railroad that the work is in conformance with the drawings and that the materials and workmanship are satisfactory.
2. A copy of this certification shall be available at the job site at all times.

C. All substructures shall be removed to at least six (6) feet below the final finished grade or at least six (6) feet below base of rail whichever is lower, unless otherwise specified by the Railroad.

D. All debris and refuse shall be removed from the railroad right of way by the Contractor. The premises shall be left in a neat and presentable condition to the exclusive satisfaction of the Railroad. Soils contaminated by fuel spills, hydraulic oil leaks, etc. will be removed from railroad right of way and replaced to the exclusive satisfaction of the Railroad.

E. If any hazardous materials are discovered, provide material protection as specified in local hazardous material codes and immediately contact the Railroad

1. If Contractor discovers any hazardous waste, hazardous substance, petroleum or other deleterious material, including but not limited to any non-containerized commodity or material, on or adjacent to Railway's Property, in or near any surface water, swamp, wetlands or waterways, while performing any work under this Agreement, Contractor must immediately: (a) notify the Railway's Resource Operations Center at 1(800) 832-5452, of such discovery: (b) take safeguards necessary to protect its employees, subcontractors, agents and/or third parties: and (c) exercise due care with respect to the release, including the taking of any appropriate measure to minimize the impact of such release.

2. If pipelines are attached to the Overhead, pipes must be purged of flammable or hazardous materials prior to beginning demolition.

3. Fuel spills, hydraulic fluid releases, equipment oil leaks or any other release of contaminants must be

reported to the Railroad. Contaminated soils must be removed and replaced to the satisfaction of the Railroad and local regulatory agencies.

F. The work progress shall be reviewed and logged by the Contractor's Engineer. Should an unplanned event occur, the Contractor shall inform the Railroad and submit a procedure to correct or remedy the occurrence.

G. Beam removal and all other demolition procedures shall take place as much as practicable with equipment positioned adjacent to and clear of all live tracks or positioned on the Overhead structure above the track. In the rare case that beams require removal with equipment positioned fouling a live track or from below the Overhead, the following steps shall be taken before beams are allowed to straddle the tracks:

1. Certain territories with high density train traffic, especially where multiple main tracks are affected, may not grant Work Windows on all tracks simultaneously. Beam removal from the underside of Overheads may not be possible unless the procedure can be accomplished in very short Work Windows or be engineered such that only one track is affected.
2. The work shall be scheduled well in advance but no later than the requirements in Section 1, paragraph 5 of this Exhibit G. The Work windows are subject to the Railroad's operational requirements for continuous train operations. The beam removal plan must be engineered to minimize the Work Window time.
3. The rails, ties and ballast shall be protected. No equipment will be crossed over or placed on the tracks unless pre-approved by the Railroad.
4. The beams shall be blocked to prevent the beams from coming into contact with the rails. Blocking shall not be placed on the rails or ties.
5. Upon approach of a train, the beams and all personnel and equipment will be moved a position to provide a minimum of 15 feet horizontal clearance and 21 ft. 6 in. vertical clearance from the nearest rail. Care must be exercised to insure that crane booms are rotated to a position parallel with the track.

SECTION IV. TRACK PROTECTION

A. The track protective cover shall be constructed before beginning bridge removal work and will be supported by falsework or members of the existing Overhead. The following are examples of protective covers that may be acceptable:

1. A decking supported by the bridge or a suspended cover from the bridge above the track clearance envelope.
2. A track shield cover over the tracks per the attached detail.
3. A framed cover outside the track clearance envelope.
4. A catcher box or loader bucket under decking and parapets overhanging the exterior girders.
5. Protection of the track ballast section must be provided to avoid contamination of the rock with fine dust and mud produced during demolition activities. Filter fabric or some other effective means to prevent ballast contamination should be incorporated into the Demolition Plan.

B. Construction equipment shall not be crossed over or placed on the tracks unless the rails, ties and ballast are protected against damage.

1. Track protection is required for all equipment including rubber tired equipment.

2. A list of equipment to be crossed over or positioned on the tracks along with the intended method of protection shall be submitted to the railroad for approval prior to use at the job site.

C. Temporary haul road crossings shall be either timbers or precast concrete panels. The type of crossing shall be determined by the Railroad.

1. Solid timbers or ballast with timber headers shall be used between multiple tracks.
2. If the job site is accessible to the public, all temporary haul road crossings shall be protected with barricades or locked gates when the Contractor is not actively working at the site.
3. Installation and removal of temporary track crossings for equipment shall be scheduled well in advance with the Railroad but no later than the requirements in Section 1, paragraph 5 of this Exhibit G.

SECTION V. CRANES

A. When cranes are operated over or adjacent to the tracks the following is required:

1. The Contractor shall verify that the foundations, soil conditions, and buried utility lines under the crane and crane outriggers can support the loads induced by the crane under an assumed maximum capacity lift. The size and material type of crane mats shall be rigid and of sufficient capacity to safely distribute the crane loads.
2. Front end loaders and backhoes cannot be used in place of a crane to lift materials over the tracks. These types of equipment do not have the necessary safety features built into the machines to circumvent overloading and tipping. Only cranes with the rated capacity to handle the loads may be used.
3. Additional track protection may be required for a crane when crossing over the track. The protection methods shall be submitted to the Railroad for review and comment well in advance of intended use.
4. Cranes and other equipment utilizing outriggers shall not place outriggers on the tracks or ballast.
5. Cranes or crane booms shall not be positioned within the track clearance envelope without Railroad Flagman protection. Cranes operating from a position farther than 25 ft. from the nearest track will need a Railroad Flagman present if the boom length is such that it could fall onto a track.
6. Upon approach of a train, the crane body shall be rotated to position the boom in a line parallel with the track. Any suspended load shall be made stationary by lowering it until contact is made with the ground. During passage of the train, the Crane Operator must stop all movements. Crane Operators shall remain in the cab with motor at idle with the load lines, boom, rotation and travel controls locked and stationary until the full length of the train has passed the job site.
7. Cranes will not be utilized during high winds.

SECTION VI. CUTTING TORCHES

A. When a cutting torch or welding equipment is used in the demolition process, the following steps shall be taken:

1. Fire suppression equipment is required on-site.
2. Do not use a torch over, between, or adjacent to the tracks unless a steel plate protective cover is used to shield against sparks and slag coming into contact with timber ties. Care shall be taken to make certain the use of a steel plate does not come in contact with the rails. See "Track Shield Details" for other requirements. Details of the shield shall be submitted to the Railroad for approval.
3. Wet the ties below the steel plate and wet other timbers and flammable demolition debris located near cutting areas.
4. Monitor the work site for at least three hours after cutting has ceased to detect a smoldering fire.

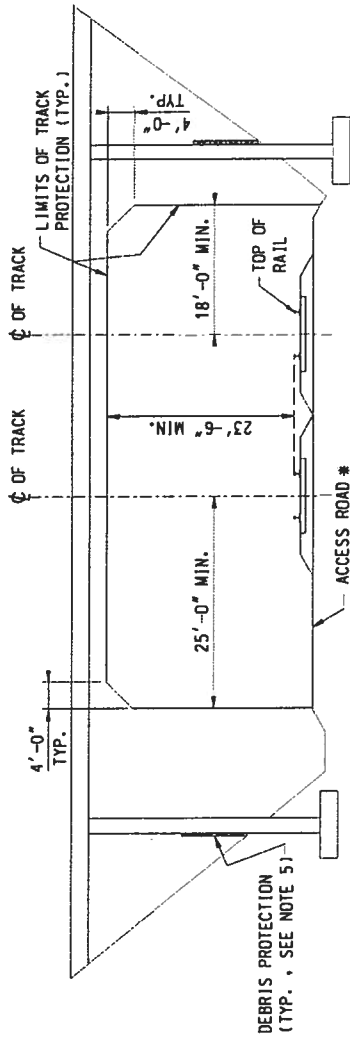
B. Extensive overhead cutting may require more robust fire suppression equipment and precautions than what would normally be required for routine cuts.

1. On days when extensive torch cutting is planned, the Contractor shall have a larger water supply on hand or take other measures as needed to effectively suppress fires.
2. Overhead torch cutting and welding must cease upon approach and passage of a train.
3. Extensive torch cutting shall not take place during high winds.
4. Contractor will clear vegetation and other combustible debris from the surrounding work areas prior to engaging in extensive torch cutting.

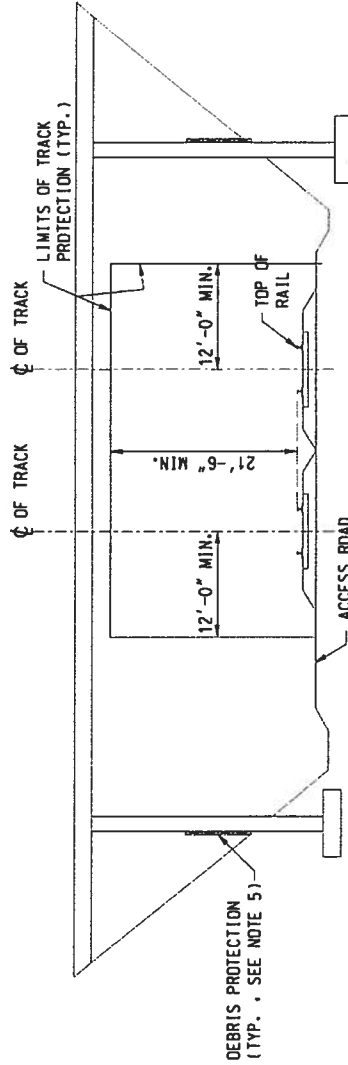
SECTION VII. UTILITIES

A. The demolition operations shall be planned such that overhead and underground utility lines are operating safely at all times. The utility lines shall be protected if affected by demolition operations. Underground utility lines shall be protected from concentrated soil loads under crane outriggers and heavy rubber tired front loaders or similar equipment. All the work associated with utility lines should be coordinated by the contractor with the respective utility companies.





BRIDGE ELEVATIONS
STANDARD LIMITS OF PROTECTION FOR FRAME PROTECTION



BRIDGE ELEVATION
MINIMUM LIMITS OF PROTECTION FOR FRAME PROTECTION
(SPECIAL PERMISSION REQUIRED, SEE NOTE 1)

1. THE STANDARD LIMITS OF PROTECTION NOTED ARE THE MIN. CLEARANCES ALLOWED WITHOUT SPECIAL PERMISSION FROM THE RAILROAD. THE REDUCED CLEARANCES NOTED MAY BE ALLOWED BY THE RAILROAD. SPECIAL PERMISSION FOR THE REDUCED CLEARANCES IS REQUIRED FROM THE RAILROAD AND PUBLIC AGENCY.
 2. THE PROTECTION FRAME SHALL AS A MINIMUM MATCH THE DEMOLITION LIMITS SHOWN AND EXTEND PAST THE BRIDGE WIDTH AS SHOWN ON THE ATTACHED DEMOLITION PLAN SHEET.
 3. FOR ADDITIONAL CLEARANCE AND PROTECTION INFORMATION REFER TO CONTRACT EXHIBITS.
 4. THE PROTECTION FRAME SHALL PREVENT DEMOLITION DEBRIS, DUST AND FINE MATERIAL FROM FALLING INTO THE RAILROAD TRACKS, ACCESS ROAD OR TRAINS. THE FRAME SHALL BE DESIGNED BY THE CONTRACTOR TO SUPPORT THE ANTICIPATED DEMOLITION LOADS, AND IN ACCORDANCE WITH CALTRANS FALSEWORK MANUAL FOR STRUCTURES OVER THE RAILROAD.
 5. DEBRIS PROTECTION IS REQUIRED NEAR THE BASE OF THE SIDE SLOPES AND ADJACENT TO ROADS USED BY DEMOLITION EQUIPMENT TO PREVENT DEBRIS FROM ROLLING ONTO TRACK. ACCESS ROAD OR DITCH. USE TIMBERS AS REQUIRED TO STOP LARGE PIECES OF ROLLING DEBRIS.
 6. ANY ACTIVITY WITHIN 25 FEET OF THE NEAREST RAIL OF A TRACK REQUIRES A FLAGMAN.
- * IF NO ACCESS ROAD USE MIN. DIMENSION FROM OTHER SIDE OF DETAIL



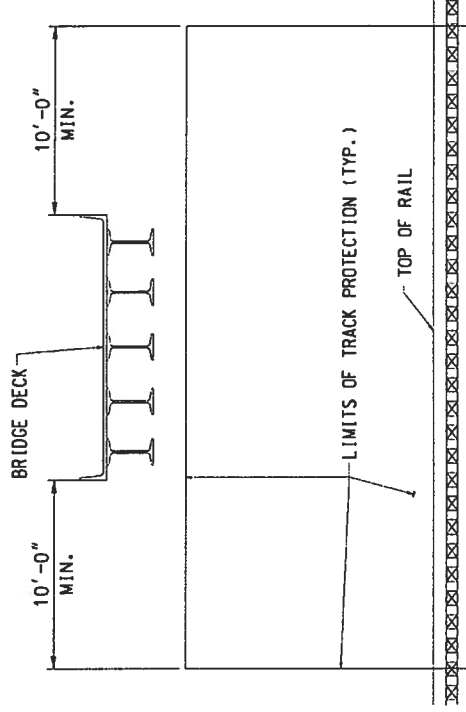
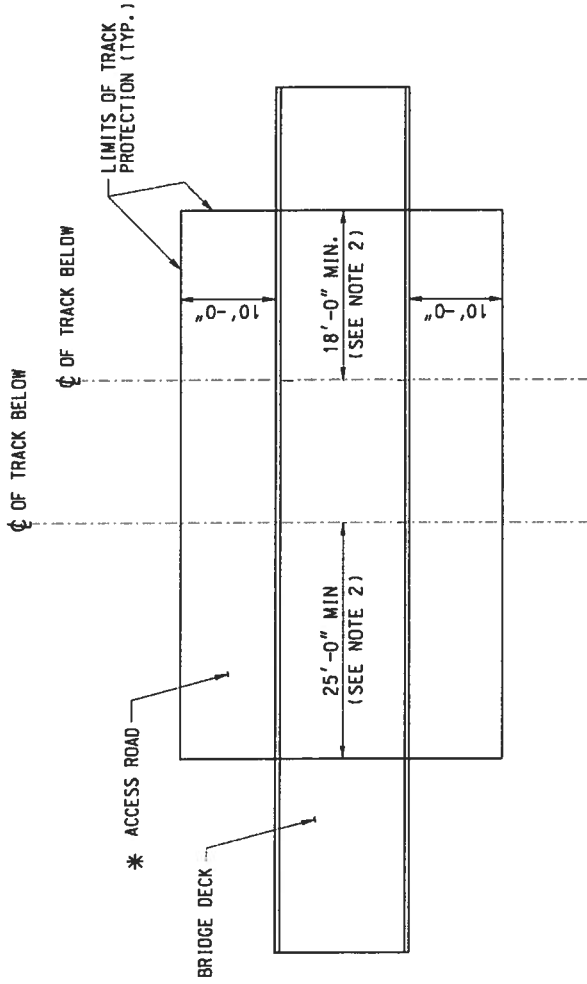
DEMOLITION FRAME PROTECTION DETAILS

DATE: OCTOBER 17, 2007

SHEET: 1 OF 3

NOTES:

1. SEE GENERAL NOTES ON BRIDGE ELEVATION SHEET.
2. STANDARD LIMITS OF PROTECTION ARE SHOWN. FOR MIN. LIMITS OF PROTECTION DIMENSIONS, SEE BRIDGE ELEVATION. MINIMUM LIMITS OF PROTECTION.

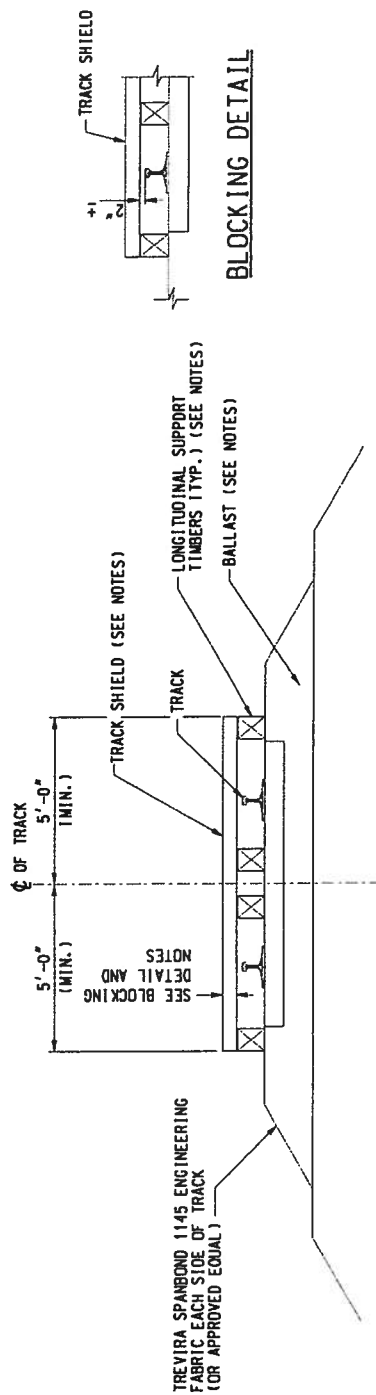


* IF NO ACCESS ROAD, USE MIN. DIMENSION FROM OTHER SIDE



DEMOLITION FRAME
PROTECTION DETAILS

DATE: OCTOBER 17, 2007 SHEET: 2 OF 3



TRACK SHIELD DETAIL **FOR DEBRIS FALLING FROM BRIDGE DECK REMOVAL** **(WHEN TRACK TIME WINDOW IS AVAILABLE)**

NOTES:

1. A FLAG MAN IS REQUIRED AT ALL TIMES DURING THE USE OF A TRACK SHIELD.
2. THE TRACK SHIELD SHALL BE DESIGNED BY THE CONTRACTOR AND SHALL BE OF SUFFICIENT STRENGTH TO SUPPORT THE ANTICIPATED LOADS, INCLUDING IMPACT AND PUNCTURE. THE SHIELD SHALL PREVENT MATERIALS AND EQUIPMENT OR DEBRIS FROM FALLING ONTO THE RAILROAD TRACK. ADDITIONAL LAYERS OF MATERIALS SHALL BE FURNISHED AS NECESSARY TO PREVENT FINE MATERIALS OR DEBRIS FROM SIFTING DOWN UPON THE TRACK.
3. THE SHIELD SHALL BE PREFABRICATED AND FURNISHED WITH LIFTING HOOKS TO SIMPLIFY REMOVAL.
4. THE SHIELD SHALL BE OF SUFFICIENT STRENGTH TO SPAN BETWEEN ITS SUPPORTS WITHOUT BEARING UPON THE RAILS AND TO WITHSTAND DROPPING RUBBLE.
5. BEFORE REMOVAL THE SHIELD SHALL BE CLEANED OF ALL DEBRIS AND FINE MATERIAL. GEOTABRIC SHALL LINE THE BALLAST SECTION TO PREVENT CONTAMINATION.
6. THE TRACK SHIELD SHALL EXTEND AT LEAST 20 FEET BEYOND THE LIMITS OF DEMOLITION TRANSVERSE TO THE EDGE OF THE BRIDGE.
7. LONGITUDINAL SUPPORT TIMBERS FOR THE SHIELD SHALL NOT EXTEND ABOVE THE TOP OF RAIL WHEN THE SHIELD IS REMOVED. BLOCKING FROM THE TOP OF RAIL TO THE BOTTOM OF THE SHIELD MAY BE ATTACHED TO THE SHIELD. REMAINING TIMBERS SHALL BE ANCHORED.
8. FOR TRAIN PASSAGE, THE RUBBLE SHALL BE REMOVED TO A MINIMUM OF 8'-6" FROM THE NEAREST RAIL AND TO AN ELEVATION NO HIGHER THAN THE TOP OF RAIL.
9. AT THE END OF THE DAY, THE RUBBLE SHALL BE REMOVED COMPLETELY TO A MINIMUM OF 10'-0" FROM THE NEAREST RAIL AND DOWN TO ORIGINAL GRADE. GEOTABRIC BARRIER SHALL BE USED TO PREVENT BALLAST CONTAMINATION BY FINE MATERIALS.
10. CARE SHALL BE TAKEN TO NOT PLACE METAL ACROSS THE TRACK RAILS. RAILROAD COMMUNICATION ARE SENT THROUGH THE RAILS AND WILL BE DISRUPTED BY A SHORT BETWEEN RAILS.
11. DETAILS SHOWN APPLY FOR TIMBER TIES. SPECIAL DETAILS ARE REQUIRED FOR CONCRETE TIES.



DEMOLITION TRACK SHIELD DETAIL

DATE: OCTOBER 17, 2007 SHEET: 3 OF 3

OVERHEAD AGREEMENT

BNSF File No. 026112Y
 Baseline Street Overhead
 U.S. D.O.T. No. 026112Y

This Agreement ("**Agreement**"), is executed to be effective as of this 17th day of March, 2009 ("**Effective Date**"), by and between BNSF RAILWAY COMPANY, a Delaware corporation ("**BNSF**"), and the STATE OF CALIFORNIA, acting through the Department of Transportation, hereinafter referred to as ("**STATE**") and the **SAN BERNARDINO ASSOCIATED GOVERNMENTS**, a body corporate and politic of the State of California, hereinafter referred to as ("**SANBAG**").

RECITALS:

WHEREAS, BNSF owns and operates a line of railroad in and through the City of San Bernardino, County of San Bernardino, State of California;

WHEREAS, STATE and The Atchison, Topeka and Santa Fe Railway Company, predecessor in interest to BNSF, hereinafter referred to as ("**Santa Fe**"), entered into an agreement dated February 27, 1958, carried in BNSF's records as Contract No. CL-61878, ("**Original Agreement**") which provided for the construction and maintenance of five (5) grade separation structures comprising of Ninth Street, Baseline Street, 16th Street, Massachusetts Avenue, and 27th Street Overheads, over and across BNSF's rail corridor hereinafter referred to as ("**Rail Corridor**"), and over its tracks;

WHEREAS, the Original Agreement also provided for the installation of a 42 inch reinforced concrete drainage pipe in the vicinity of Baseline Street hereinafter referred to as ("**Drainage Pipe**");

WHEREAS, this Agreement covers the demolition and reconstruction of the Baseline Street Overhead and the ownership and obligation to maintain the Drainage Pipe as set forth in the Original Agreement;

WHEREAS, STATE and the San Bernardino Associated Governments hereinafter referred to as "SANBAG", propose to reconstruct Interstate Highway I-215, through the City of San Bernardino, in order to accommodate the construction of High Occupancy Vehicle (HOV) lanes involving the demolition and reconstruction of the Baseline Street Overhead by means of a three span, 375.33 foot long cast-in-place post-tensioned box girder bridge supported on multi-column bents and high seat abutments. The abutments will be supported on 24-inch diameter pipe piles;

WHEREAS, STATE and SANBAG have entered into a Design Cooperative Agreement, dated September 3, 2008 providing for SANBAG's design for the reconstruction of the Segment 2 portion of the Interstate Highway I-215 reconstruction project, which includes the reconstruction of the Baseline Street Overhead.

WHEREAS, STATE and SANBAG will enter into a Construction Cooperative Agreement prior to the start of construction of the Project as described in Article I, Section 1 of this Agreement, that will provide for SANBAG's construction of the **Project** with STATE owning and maintaining the **Structure** as described in Article I, Section 1.

NOW, THEREFORE, in consideration of the mutual covenants and agreements of the parties contained herein, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

ARTICLE I – SCOPE OF WORK

1. The term "**Project**" as used herein includes any and all work related to the removal of the existing Baseline Street Overhead, the construction of a replacement Baseline Street Overhead, and the construction of the I-215 On and Off Ramps, more particularly described on the Exhibit A attached hereto

and incorporated herein, including but not limited to, any and all changes to telephone, telegraph, signal and electrical lines and appurtenances, temporary and permanent track work, fencing, grading, alterations to or new construction of drainage facilities, preliminary and construction engineering and contract preparation. The term "Structure" as used herein shall mean the Baseline Street Overhead as reconstructed.

ARTICLE II – BNSF OBLIGATIONS

In consideration of the covenants of STATE and SANBAG set forth herein and the faithful performance thereof, BNSF agrees as follows:

1. Upon STATE's payment to BNSF of the sum of Five Thousand Two Hundred and Eighty Eight and No/100 DOLLARS (\$5,288.00), BNSF shall grant to SANBAG, its successors and assigns, upon and subject to the terms and conditions set forth in this Agreement, a temporary non-exclusive license (hereinafter called, "Temporary Construction License") to construct the Structure across or upon the portion of BNSF's Rail Corridor described further on Exhibit A, excepting and reserving BNSF's rights, and the rights of any others who have obtained, or may obtain, permission or authority from BNSF, to do the following:

- (a) Operate, maintain, renew and/or relocate any and all existing railroad track or tracks, wires, pipelines and other facilities of like character upon, over or under the surface of said rail corridor;
- (b) Construct, operate, maintain, renew and/or relocate upon said Rail Corridor, without limitation, such facilities as the BNSF may from time to time deem appropriate, provided such facilities do not materially interfere with SANBAG'S construction of the Structure;
- (c) Use or operate the Rail Corridor as BNSF may from time to time deem appropriate, provided such use or operations does not materially interfere with STATE's use of the Structure.

The Temporary Construction License shall be in the form attached hereto as Exhibit B and by this reference made a part hereof, and shall be for a term beginning on the authorized commencement date as set forth hereinafter in Article III, Section 11 (c) ("Effective Date") and ending on the earlier of (i) completion of the Structure, or (ii) Thirty (30) months following the Effective Date of the Temporary Construction License. The Temporary Construction License and related rights to be given by BNSF to SANBAG shall be without warranty of title of any kind, express or implied, and no covenant of warranty of title will be implied from the use of any word or words therein contained. The Temporary Construction License shall be for the Project and for no other purpose. SANBAG acknowledges and agrees that SANBAG shall not have the right, under the Temporary Construction License, to use the Structure. In the event STATE or SANBAG is evicted by anyone owning, or claiming title to or any interest in said Rail Corridor, BNSF will not be liable to STATE or SANBAG for any damages, losses or any expenses of any nature whatsoever. The granting of similar rights to others, subsequent to the date of this Agreement, will not impair or interfere with the rights granted to SANBAG pursuant to the Temporary Construction License.

Upon payment to BNSF of the additional sum of Thirty Four Thousand Six Hundred Seventy One and No/100 DOLLARS (\$34,671.00), such payment to be made within thirty (30) days of the giving of the notice required pursuant to Article III, Section 14 of this Agreement., BNSF shall deliver to STATE, its successors and assigns, a perpetual easement to enter upon and use that portion of BNSF's Rail Corridor described therein as is necessary to use and maintain the Structure. The Easement shall be in the form attached hereto as Exhibit B-1 and by this reference made a part hereof.

2. BNSF will furnish all labor, materials, tools, and equipment for railroad work required for the construction of the Project, such railroad work and the estimated cost thereof being as shown on Exhibit D attached hereto and made a part hereof. In the event construction on the Project has not commenced within six (6) months following the Effective Date, BNSF may, in its sole and absolute discretion, revise the cost estimates set forth in said Exhibit D. In such event, the revised cost estimates will become a part of this Agreement as though originally set forth herein. Any item of work incidental to the items listed on

Exhibit D not specifically mentioned therein may be included as a part of this Agreement upon written approval of SANBAG, which approval will not be unreasonably withheld. Construction of the Project will include the following principle elements of railroad work by BNSF:

- (a) Procurement of materials, equipment and supplies necessary for the railroad work;
- (b) Preliminary engineering, design, and contract preparation;
- (c) Furnishing of flagging services necessary for the safety of BNSF's property and the operation of its trains during construction of the Project as set forth in further detail on Exhibit C, attached to this Agreement and made a part hereof;
- (d) Furnishing engineering and inspection as required in connection with the construction of the Project and;
- (e) Providing a contract project coordinator, at SANBAG's expense, to serve as a project manager for the Project;

3. BNSF will do all railroad work set forth in Article II, Section 2 above on an actual cost basis, when BNSF, in its sole discretion, determines it is required by its labor agreements to perform such work with its own employees working under applicable collective bargaining agreements or by contractor(s) if necessary.

4. SANBAG agrees to reimburse BNSF for work of an emergency nature caused by SANBAG or SANBAG's contractor in connection with the Project which is reasonably necessary for the immediate restoration of railroad operations, or for the protection of persons or BNSF property. Such work may be performed by BNSF without prior approval of SANBAG and SANBAG agrees to fully reimburse BNSF for all such emergency work.

5. BNSF may charge SANBAG for insurance expenses, including self-insurance expenses, when such expenses cover the cost of Employer's Liability (including, without limitation, liability under the Federal Employer's Liability Act) in connection with the construction of the Project. Such charges will be considered part of the actual cost of the Project, regardless of the nature or amount of ultimate liability for injury, loss or death to BNSF's employees, if any.

6. During the construction of the Project, BNSF will send SANBAG progressive invoices detailing the costs of the railroad work performed by BNSF under this Agreement. Pursuant to the California Prompt Payment Act, CALIFORNIA CODES, GOVERNMENT CODE, SECTION 927-927.12., SANBAG must reimburse BNSF for completed force-account work within forty-five (45) calendar days from the date of SANBAG's receipt of the invoice for such work. Upon completion of the Project, BNSF will send SANBAG a detailed invoice of final costs, segregated as to labor and materials for each item in the recapitulation shown on Exhibit D. If SANBAG fails to make payment of a BNSF invoice within said forty-five (45) days, SANBAG shall pay a penalty at a rate of 1 percent above the rate accrued on June 30 of the prior year by the Pooled Money Investment Account, not to exceed a rate of 15 percent pursuant to Section 927.6 (b) of said Government Code.

ARTICLE III – SANBAG OBLIGATIONS

In consideration of the covenants of STATE and BNSF set forth herein and the faithful performance thereof, SANBAG agrees as follows:

1. SANBAG shall furnish to BNSF and STATE plans and specifications for the Project together with calculations with the railroad clearances expressed in **English Units**. One complete reduced size 11" x 17" paper copy shall be submitted to BNSF's Director of Structural Engineering. A PDF copy of the plans and specifications should be sent to both BNSF'S Manager Public Projects and BNSF'S Director Structural Engineering. The PDF copy with a file size of two (2) megabytes or less should be sent via an email attachment. Should the PDF copy of the plans and specifications exceed two (2) megabytes, a CD (Compact Disk) of the plans and specifications should be sent via overnight mail service to both BNSF

offices. The email and mailing addresses are included in Article V, Section 23. Sets of said plans shall be submitted to BNSF and STATE for approval prior to commencement of any construction. BNSF will give SANBAG final written approval of the plans and specifications substantially in the form of Exhibit E, attached to this Agreement and made a part hereof. Upon BNSF'S final written approval of the plans and specifications, said plans and specifications will become part of this Agreement and are hereby incorporated herein. Any approval of the plans and specifications by BNSF shall in no way obligate BNSF in any manner with respect to the finished product design and/or construction. Any approval by BNSF shall mean only that the plans and specifications meet BNSF standard specifications, and such approval by BNSF shall not be deemed to mean that the plans and specifications or construction is structurally sound and appropriate or that such plans and specifications meet applicable regulations, laws, statutes or local ordinances and/or building code.

2. SANBAG must provide for and maintain minimum vertical and horizontal clearances, as required and approved by BNSF as part of the plans and specifications for the Project.

3. SANBAG must make any and all arrangements for the installation or relocation of wire lines, pipe lines and other facilities owned by private persons, companies, corporations, political subdivisions or public utilities other than BNSF which may be necessary for the construction of the Project.

4. SANBAG must construct the Project as shown on the attached Exhibit A and do all work ("**SANBAG's Work**") provided for in the plans and specifications for the Project, except railroad work that will be performed by BNSF herein. SANBAG must furnish all labor, materials, tools and equipment for the performance of SANBAG's Work. The principal elements of SANBAG's Work are as follows:

- (a) Preliminary and final Engineering;
- (b) Demolition and removal of the existing Baseline Street Overhead;
- (c) Design and the Construction of the Structure;
- (d) All necessary grading and paving, including backfill of excavations and restoration of disturbed vegetation on BNSF's Rail Corridor;
- (e) Provide suitable drainage, both temporary and permanent;
- (f) Apply the D.O.T. Crossing Number 026112Y in a conspicuous location on the Structure.
- (g) Job site cleanup including removal of all construction materials, concrete debris, surplus soil, refuse, contaminated soils, asphalt debris, litter and other waste materials to the satisfaction of BNSF;

5. SANBAG will acquire for the benefit of BNSF and at no cost to BNSF a perpetual easement to enter upon and use that portion of Baseline Street's right of way for the use and maintenance of BNSF's Signal House with easement area to include the land occupied by the Signal House at its original location and at its present location as shown on said Exhibit A.

6. SANBAG's Work must be performed by SANBAG or SANBAG's contractor in a manner that will not endanger or interfere with the safe and timely operations of BNSF and its facilities.

7. SANBAG must require its contractor(s) to notify BNSF's Roadmaster at least thirty (30) calendar days prior to requesting a BNSF flagman in accordance with the requirements of Exhibit C attached hereto. Additionally, SANBAG must require its contractor(s) to notify BNSF's Manager of Public Projects thirty (30) calendar days prior to commencing work on BNSF property or near BNSF tracks.

8. SANBAG or its contractor(s) shall submit one reduced size 11" x 17" paper copy, including calculations, expressed in **English Units** of the plans and specifications for proposed shoring, falsework, or cribbing to be used over, under, or adjacent to BNSF'S tracks to BNSF' S Director Structural Engineering. SANBAG or its contractor(s) shall submit a PDF copy of the plans and specifications for the proposed shoring, falsework, or cribbing to both BNSF'S Manager Public Projects and BNSF'S Director

Structural Engineering. The PDF copy with a file size of two (2) megabytes or less should be sent via an email attachment. Should the PDF copy of the plans and specifications exceed two (2) megabytes, a CD (Compact Disk) of the plans and specifications should be sent via overnight mail service to both BNSF offices for approval. The email and mailing addresses are included in Article V, Section 23. The shoring, falsework or cribbing used by SANBAG'S contractor shall comply with the BNSF Bridge Requirements set forth on Exhibit F, and BNSF's Instructions FOR PREPARATION OF DEMOLITION PLANS as set forth in Exhibit G with both Exhibits attached to this Agreement and incorporated herein, and all applicable requirements promulgated by state and federal agencies, departments, commissions and other legislative bodies.

Falsework shall be designed according to the State of California, Department of Transportation FALSEWORK MANUAL available at this Web Site:

[http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCompleteManuals/FalseworkManual\(Rev32\).pdf](http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCompleteManuals/FalseworkManual(Rev32).pdf).

9. SANBAG must include the following provisions in any contract with its contractor(s) performing work on said Project:

- (a) The Contractor is placed on notice that fiber optic, communication and other cable lines and systems (collectively, the "Lines") owned by various telecommunications companies may be buried on BNSF's property or Rail Corridor. The locations of these Lines have been included on the plans based on information from the telecommunications companies. The contractor will be responsible for contacting BNSF's Project Engineer at telephone number 909 386 4079 and/or the telecommunications companies and notifying them of any work that may damage these Lines or facilities and/or interfere with their service. The contractor must also mark all Lines shown on the plans or marked in the field in order to verify their locations. The contractor must also use all reasonable methods when working in the BNSF Rail Corridor or on BNSF property to determine if any other Lines (fiber optic, cable, communication or otherwise) may exist.
- (b) Failure to mark or identify these Lines will be sufficient cause for any BNSF Representative to stop construction at no cost to the SANBAG or BNSF until these items are completed.
- (c) In addition to the liability terms contained elsewhere in this Agreement, the contractor hereby indemnifies, defends and holds harmless BNSF for, from and against all cost, liability, and expense whatsoever (including, without limitation, attorney's fees and court costs and expenses) arising out of or in any way contributed to by any act or omission of Contractor, its subcontractors, agents and/or employees that cause or in any way or degree contribute to (1) any damage to or destruction of any Lines by Contractor, and/or its subcontractors, agents and/or employees, on BNSF's property or within BNSF's Rail Corridor, (2) any injury to or death of any person employed by or on behalf of any telecommunications company, and/or its contractor, agents and/or employees, on BNSF's property or within BNSF's Rail Corridor, and/or (3) any claim or cause of action for alleged loss of profits or revenue by, or loss of service by a customer or user of such telecommunication company(ies). **THE LIABILITY ASSUMED BY CONTRACTOR WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DAMAGE, DESTRUCTION, INJURY, DEATH, CAUSE OF ACTION OR CLAIM WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF BNSF, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, UNLESS SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE WILLFUL MISCONDUCT OR SOLE NEGLIGENCE OF BNSF.**
- (d) The Contractor will be responsible for the rearrangement of any facilities or Lines determined to interfere with the construction. The Contractor must cooperate fully with any telecommunications company(ies) in performing such rearrangements.

10. SANBAG must incorporate in each prime contract for construction of the Project, or the specifications therefore (i) the provisions set forth in Article III, Sections 6, 7, 8, 9, and 11; (ii) the

provisions set forth in Article V, Sections 1, 2, 3, 4, 5, 6, 7, 11 and 12, and (iii) the provisions set forth in Exhibit C, Exhibit C-I, Exhibit F and Exhibit G, with the herein referenced Exhibits attached hereto and by reference made a part hereof.

11. Except as otherwise provided below in this Section 11, all construction work performed hereunder by SANBAG for the Project will be pursuant to a contract or contracts to be let by SANBAG, and all such contracts must include the following:

- (a) All work performed under such contract or contracts within the limits of BNSF's Rail Corridor must be performed in a good and workmanlike manner in accordance with plans and specifications approved by BNSF;
- (b) Changes or modifications during construction that affect safety or BNSF operations must be subject to BNSF's approval;
- (c) No work will be commenced within BNSF's Rail Corridor until each of the prime contractors employed in connection with said work must have (i) executed and delivered to BNSF a letter agreement in the form of Exhibit C-I, and (ii) delivered to and secured BNSF's approval of the required insurance; and
- (d) If it is in SANBAG's best interest, SANBAG may direct that the construction of the Project be done by day labor under the direction and control of SANBAG, or if at any time, in the opinion of SANBAG, the contractor has failed to prosecute with diligence the work specified in and by the terms of said contract, SANBAG may terminate its contract with the contractor and take control over the work and proceed to complete the same by day labor or by employing another contractor(s) provided; however, that any contractor(s) replacing the original contractor(s) must comply with the obligations in favor of BNSF set forth above and, provided further, that if such construction is performed by day labor, SANBAG will, at its expense, procure and maintain on behalf of BNSF the insurance required by Exhibit C-1.
- (e) To facilitate scheduling for the Project, SANBAG shall have its contractor give BNSF's Project Engineer at telephone number 909 386 4079 eight (8) weeks advance notice of the proposed times and dates for work windows. BNSF and SANBAG's contractor will establish mutually agreeable work windows for the Project. SANBAG shall inform its contractor that any request for work windows with less than eight (8) weeks advance notice will have a reduced probability of approval. BNSF has the right at any time to revise or change the work windows, due to train operations or service obligations. BNSF will not be responsible for any additional costs and expenses resulting from a change in work windows. Additional costs and expenses resulting from a change in work windows shall be accounted for in the contractor's expenses for the Project.
- (f) The plans and specifications for the Project must be in compliance with the Bridge Requirements set forth in Exhibit F and the INSTRUCTIONS FOR PREPARATION OF DEMOLITION PLANS set forth in Exhibit G, with both Exhibits attached to this Agreement and incorporated herein.

12. SANBAG must advise the BNSF Manager of Public Projects, in writing, of the completion date of the Project within thirty (30) days after such completion date. Additionally, SANBAG must notify BNSF's Manager of Public Projects, in writing, of the date on which SANBAG, and/or STATE and/or SANBAG's Contractor will meet with BNSF for the purpose of making final inspection of the Project.

13. TO THE FULLEST EXTENT PERMITTED BY LAW, SANBAG HEREBY RELEASES, INDEMNIFIES, DEFENDS AND HOLDS HARMLESS BNSF, ITS AFFILIATED COMPANIES, PARTNERS, SUCCESSORS, ASSIGNS, LEGAL REPRESENTATIVES, OFFICERS, DIRECTORS, SHAREHOLDERS, EMPLOYEES AND AGENTS FOR, FROM AND AGAINST ANY AND ALL CLAIMS, LIABILITIES, FINES, PENALTIES, COSTS, DAMAGES, LOSSES, LIENS, CAUSES OF ACTION, SUITS, DEMANDS, JUDGMENTS AND EXPENSES (INCLUDING, WITHOUT LIMITATION, COURT COSTS AND ATTORNEYS' FEES) OF ANY NATURE, KIND OR DESCRIPTION OF ANY PERSON

(INCLUDING, WITHOUT LIMITATION, THE EMPLOYEES OF THE PARTIES HERETO) OR ENTITY DIRECTLY OR INDIRECTLY ARISING OUT OF, RESULTING FROM OR RELATED TO (IN WHOLE OR IN PART) (I) THE USE, OCCUPANCY OR PRESENCE OF SANBAG, ITS CONTRACTORS, SUBCONTRACTORS, EMPLOYEES OR AGENTS IN, ON, OR ABOUT THE CONSTRUCTION SITE, (II) THE PERFORMANCE, OR FAILURE TO PERFORM BY SANBAG, ITS CONTRACTORS, SUBCONTRACTORS, EMPLOYEES, OR AGENTS, ITS WORK OR ANY OBLIGATION UNDER THIS AGREEMENT, (III) THE SOLE OR CONTRIBUTING ACTS OR OMISSIONS OF SANBAG, ITS CONTRACTORS, SUBCONTRACTORS, EMPLOYEES, OR AGENTS IN, ON, OR ABOUT THE CONSTRUCTION SITE, (IV) SANBAG'S BREACH OF THE TEMPORARY CONSTRUCTION LICENSE GRANTED TO SANBAG PURSUANT TO ARTICLE II OF THIS AGREEMENT, (V) ANY RIGHTS OR INTERESTS GRANTED TO SANBAG PURSUANT TO THE TEMPORARY CONSTRUCTION LICENSE DISCUSSED IN ARTICLE II OF THIS AGREEMENT, (VI) SANBAG'S OCCUPATION AND USE OF BNSF'S PROPERTY OR RAIL CORRIDOR, OR (VII) AN ACT OR OMISSION OF SANBAG OR ITS OFFICERS, AGENTS, INVITEES, EMPLOYEES OR CONTRACTORS OR ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM, OR ANYONE THEY CONTROL OR EXERCISE CONTROL OVER. THE LIABILITY ASSUMED BY SANBAG WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DAMAGE, DESTRUCTION, INJURY OR DEATH WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF BNSF, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, UNLESS SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE WILLFUL MISCONDUCT OR SOLE NEGLIGENCE OF BNSF.

14. SANBAG must give BNSF's Manager of Public Projects written notice to proceed ("**Notice to Proceed**") with the railroad work after receipt of necessary funds for the Project. BNSF will not begin the railroad work (including, without limitation, procurement of supplies, equipment or materials) until written notice to proceed is received from SANBAG. The Notice to Proceed must reference BNSF's file number 026112Y.

ARTICLE IV - STATE OBLIGATIONS

IN CONSIDERATION of the covenants of BNSF and SANBAG herein contained and the faithful performance thereof, STATE agrees:

1. To permit SANBAG to act as the responsible lead agency to design and construct the Project.
2. STATE must make application to the Public Utilities Commission of the State of California ("**Commission**") for an order authorizing construction of the Project and to furnish to the Commission plans of the proposed construction, approved by BNSF, together with a copy of this agreement and to obtain all other required permits and approvals for the construction of the Project.
3. STATE will acquire all properties required to construct the Project and maintain the Structure;
4. In addition to the terms and conditions set forth elsewhere in this Agreement, including, but not limited to, the terms and conditions stated in Exhibit F, BNSF and STATE agree to the following terms upon completion of construction of the Project:
 - (a) STATE will own and maintain, at its sole cost and expense, the Structure, the Drainage Pipe, the highway approaches, and appurtenances thereto, lighting, drainage and any access roadways to BNSF gates installed pursuant to this Agreement.
 - (b) STATE will arrange for removal of graffiti from the Structure;
 - (c) STATE must maintain D.O.T. Crossing Number 026112Y in legible condition in the conspicuous location on the Structure where applied by SANBAG during construction;
 - (d) It is understood by STATE that the right to install utilities is restricted to the placement of underground utilities beneath BNSF's tracks located a minimum of fifty (50) feet from abutments, piers, piles, or footings with the exception that upon BNSF's prior approval BNSF will permit selected utilities to be run through the deck of the Structure. Under no

circumstances will utilities be allowed to hang from the Structure. All utility crossings within the limits of BNSF's Rail Corridor will be covered by separate agreements between BNSF and each of the owners of the utilities.

- (e) Upon request from BNSF, STATE shall remove all trash and debris associated with the Structure from BNSF's property.
- (f) In conformance with and limited to the applicable effect of California Laws insofar as the indemnity and insurance provisions set forth in any of the preceding sections or any rider, amendment or addendum hereto, State is self-insured. If State performs (i) alterations or modifications to the Structure, or (ii) any maintenance or other work on the Structure with heavy tools, equipment or machinery at ground surface level horizontally within 25'-0" of the centerline of the nearest track, or (iii) any maintenance or other work outside the limits of the deck of the Structure vertically above the top of the rail, then STATE, shall provide BNSF defense and indemnification at least equal to the defense, indemnification and insurance provisions contained in Exhibit C-1 in accordance with California Government Code section 14662.5. Nothing herein shall be deemed to insure BNSF against its sole negligence or willful misconduct.

In the event any of the Work to be done on behalf of STATE upon BNSF's Rail Corridor is to be done by a contractor or subcontractor, said contractor or subcontractor shall provide to BNSF the insurance policies, certificates, binders, and/or endorsements in favor of BNSF as contained in said Exhibit C-1 as the same may be revised from time to time.

5. Subject to the restrictions imposed by Article V, Section 11 below, STATE must notify and obtain prior authorization from BNSF's Manager of Public Projects before entering BNSF's Rail Corridor for maintenance purposes. If the construction work hereunder is contracted, STATE must require its prime contractor(s) to comply with the obligations set forth in Exhibit C, Exhibit C-1 and Exhibit F, as the same may be revised from time to time. STATE will be responsible for its contractor(s) compliance with such obligations.

6. PURSUANT TO CALIFORNIA GOVERNMENT CODE SECTION 14662.5, STATE HEREBY AGREES TO INDEMNIFY AND HOLD HARMLESS BNSF FROM, AND TO REPAIR OR PAY FOR, ANY DAMAGE PROXIMATELY CAUSED BY REASON OF THE USES AUTHORIZED BY THE EASEMENT SET FORTH IN EXHIBIT B-1 TO THIS AGREEMENT.

ARTICLE V – JOINT OBLIGATIONS

IN CONSIDERATION of the premises, the parties hereto mutually agree to the following:

1. All work contemplated in this Agreement must be performed in a good and workmanlike manner and each portion must be promptly commenced by the party obligated hereunder to perform the same and thereafter diligently prosecuted to conclusion in its logical order and sequence. Furthermore, any changes or modifications during construction which affect BNSF will be subject to BNSF's approval prior to the commencement of any such changes or modifications.

2. The work hereunder must be done in accordance with the Bridge Requirements set forth on Exhibit F, the Instructions For Preparation Of Demolition Plans as set forth in Exhibit G, and the detailed plans and specifications approved by BNSF.

3. SANBAG must require its contractor(s) to reasonably adhere to the Project's construction schedule for all Project work. The parties hereto mutually agree that BNSF's failure to complete the railroad work in accordance with the construction schedule due to inclement weather or unforeseen railroad emergencies will not constitute a breach of this Agreement by BNSF and will not subject BNSF to any liability. Regardless of the requirements of the construction schedule, BNSF reserves the right to reallocate the labor forces assigned to complete the railroad work in the event of an emergency to provide for the immediate restoration of railroad operations (BNSF or its related railroads) or to protect persons or

property on or near any BNSF owned property. BNSF will not be liable for any additional costs or expenses resulting from any such reallocation of its labor forces. The parties mutually agree that any reallocation of labor forces by BNSF pursuant to this provision and any direct or indirect consequences or costs resulting from any such reallocation will not constitute a breach of this Agreement by BNSF.

4. BNSF shall have the right to request any SANBAG employee, or STATE employee, who enters BNSF's Rail Corridor and because of their incompetence, neglect of duty, unsafe conduct or misconduct and/or they adversely affected BNSF's operations or facilities, be removed from the Rail Corridor. In the event SANBAG, or STATE elects not to honor such request, BNSF may stop work within its Rail Corridor until the matter has been fully resolved to BNSF's satisfaction. The party whose employee has been asked to leave the Rail Corridor will indemnify BNSF and the other parties against any claims arising from such removal.

5. BNSF: will have the right to stop construction work on the Project if any of the following events take place: (i) Contractor (or any of its subcontractors) performs the Project work in a manner contrary to the plans and specifications approved by BNSF; (ii) Contractor (or any of its subcontractors), in BNSF's opinion, prosecutes the Project work in a manner which is hazardous to BNSF property, facilities or the safe and expeditious movement of railroad traffic; (iii) the insurance described in the attached Exhibit C-1 is canceled during the course of the Project; or (iv) STATE fails to pay BNSF for the Easement pursuant to Article II, Section 1 of this Agreement. The work stoppage will continue until all necessary actions are taken by STATE, Contractor or its subcontractor to rectify the situation to the satisfaction of BNSF's Division Engineer or until additional insurance has been delivered to and accepted by BNSF. In the event of a breach of (i) this Agreement, (ii) the Temporary Construction License, or (iii) the Easement, BNSF may immediately terminate the Temporary Construction License or the Easement. Any such work stoppage under this provision will not give rise to any liability on the part of BNSF. BNSF's right to stop the work is in addition to any other rights BNSF may have including, but not limited to, actions or suits for damages or lost profits. In the event that BNSF desires to stop construction work on the Project, BNSF agrees to immediately notify the following individual in writing:

SANBAG Director of Freeway Construction
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410
Fax: (909) 388-2002.

6. SANBAG's or any STATE employee, agents, contractors, representatives and invitees shall wear Personal Protective Equipment ("PPE") when on the BNSF's Rail Corridor during construction of the Project or performing subsequent maintenance after completion of construction. The PPE shall meet applicable OSHA and ANSI specifications. Current BNSF PPE requirements are listed on the web site, www.contractororientation.com. A partial list of BNSF's PPE requirements include; a) safety glasses: permanently affixed side shields; no yellow lenses, b) hard hats with high visibility orange cover, c) safety shoes: hardened toe, above-the-ankle lace-up with a defined heel and d), high visibility retro-reflective orange vests are required as specified by BNSF's representative in charge of the Project. PPE requirements as defined on the web site, will be amended from time to time, and shall take precedence over the Partial list of requirements outlined in this Section 6 of Article V. Hearing protection, fall protection and respirators will be worn as required by State and Federal regulations.

7. SANBAG must supervise and inspect the operations of all SANBAG contractors to assure compliance with the plans and specifications approved by BNSF, the terms of this Agreement and all safety requirements of the BNSF railroad. If BNSF determines that proper supervision and inspection is not being performed by SANBAG personnel at any time during construction of the Project, BNSF has the right to stop construction (within or adjacent to its operating Rail Corridor). Construction of the Project will not proceed until SANBAG corrects the situation to BNSF's reasonable satisfaction. If BNSF feels the situation is not being corrected in an expeditious manner, BNSF will immediately notify SANBAG Director of Freeway Construction for appropriate corrective action.

8. The Project funding is contemplated to come from mixed sources including Federal funds. Pursuant FEDERAL-AID POLICY GUIDE, dated December 9, 1991, Transmittal 1 23 CFR 646B which states projects for the reconstruction of existing grade separations are deemed to generally be of no ascertainable net benefit to the railroad and there shall be no required railroad share of the costs.

9. Pursuant to this section and Article II, Section 6 herein, SANBAG must reimburse BNSF in full for the actual costs of all work performed by BNSF under this Agreement.
10. All expenses detailed in statements sent to SANBAG pursuant to Article II, Section 6 herein will comply with the terms and provisions of the Federal Aid Highway Program Manual, U.S. Department of Transportation, as amended from time to time, which manual is hereby incorporated into and made a part of this Agreement by reference. The parties mutually agree that BNSF's preliminary engineering, design, and contract preparation costs described in Article II, Section 2 herein are part of the costs of the Project even though such work may have preceded the date of this Agreement and the issuance of Notice to Proceed as more particularly described in Article III, Section 14.
11. The parties mutually agree that no construction activities for the Project, nor future maintenance of the Structure once completed, that would interfere with operations of the Rail Corridor will be permitted during the fourth quarter of each calendar year. Emergency work will be permitted only upon prior notification to BNSF's Network Operations Center (telephone number: 800 832-5452). The parties hereto mutually understand and agree that trains cannot be subjected to delay during this time period.
12. Subject to the restrictions imposed by Article V, Section 11 above, the construction of the Project will not commence until SANBAG gives BNSF's Manager of Public Projects thirty (30) days prior written notice of such commencement. The commencement notice will reference BNSF's file number 026112Y. and must state the time that construction activities will begin.
13. Within 90 days of the conclusion of the Project and final acceptance by BNSF, SANBAG must provide BNSF with a complete electronic set of the bridge plans with the railroad clearances (prepared in English Units). BNSF will also accept a marked up paper copy of the bridge plans labeled "As Built". The marked up copy of those plans will reflect any and all deviations from the original plans that occurred during construction. The electronic set of bridge plans will be submitted in Micro Station *.dgn electronic format (preferred) or AutoCAD *.dwg format. Electronic plans are to be submitted in the original format used for CAD plan preparation and not converted to another format prior to submission. The "As Built" plans shall show actual measured "as constructed" clearances as well as depth, size and location of all foundation components. The plans shall show dimensioned locations of existing and relocated utilities. The As Built plans must comply with the Bridge Requirements set forth on Exhibit F and depict all information in BNSF engineering stationing and mile post pluses. The As Built plans must also include plan and profile, structural bridge drawings and specifications, and drainage plans. All improvements and facilities must be shown. It is understood that BNSF prefers to receive the "As Built" plans in an electronic format.
14. BNSF may, at its expense, make future changes or additions to the railroad components of the Structure if necessary or desirable, in BNSF's sole discretion, including, without limitation the following: (i) the right to raise or lower the grade or change the alignment of its tracks, (ii) the right to lay additional track or tracks, or (iii) the right to build other facilities in connection with the operation of its railroad. Such changes or additions must not change or alter the highway components of the Structure. If it becomes necessary or desirable in the future to change, alter, widen or reconstruct the highway components of the Structure to accommodate railroad projects, the cost of such work, including any cost incidental to alteration of railroad or highway facilities made necessary by any such changes to the Structure, will be divided between BNSF and STATE in such shares as may be mutually agreed to by the parties hereto. Any alteration or reconstruction of the highway components of the Structure will be covered by a Commission order.
15. STATE may, at STATE's sole expense, alter or reconstruct the highway components of the Structure if necessary or desirable, due to traffic conditions or pedestrian or other recreational traffic, provided, however, that any such alteration or reconstruction must not encroach further upon or occupy the surface of BNSF's Rail Corridor to a greater extent than is contemplated by the plans and specifications to be approved by BNSF pursuant to Article III, Section 1 herein, without obtaining BNSF's prior written consent and the execution of a supplement to this Agreement or the completion of a separate agreement. Any alteration or reconstruction of the highway components of the Structure will be covered by a Commission order.

16. Any books, papers, records and accounts of the parties hereto relating to the work hereunder or the costs or expenses for labor and material connected with the construction will at all reasonable times be open to inspection and audit by the agents and authorized representatives of the parties hereto and the Federal Highway Administration, for a period of three (3) years from the date of the final BNSF invoice under this Agreement.

17. The covenants and provisions of this Agreement are binding upon and inure to the benefit of the successors and assigns of the parties hereto. Notwithstanding the preceding sentence, no party hereto may assign any of its rights or obligations hereunder without the prior written consent of the other party.

18. In the event construction of the Project does not commence within three (3) years of the Effective Date, this Agreement will become null and void.

19. Neither termination nor expiration of this Agreement will release any party from any liability or obligation under this Agreement, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination or expiration.

20. To the maximum extent possible, each provision of this Agreement will be interpreted in such a manner as to be effective and valid under applicable law. If any provision of this Agreement is prohibited by, or held to be invalid under, applicable law, such provision will be ineffective solely to the extent of such prohibition or invalidity and the remainder of the provision will be enforceable.

21. Only that portion of the aforesaid Original Agreement between the STATE and Santa Fe that pertains to the Baseline Street Overhead and the Drainage Pipe as originally constructed shall terminate on the completion date of the Project as provided for in Article III, Section 12 of this Agreement. The Original Agreement shall remain in full force and effect for the remaining four grade separations, Ninth Street, 16th Street, Massachusetts Avenue, and 27th Street until they are terminated by separate agreement. Such termination shall not release any party thereto from any liability or obligation thereunder, resulting from any act, omission or event happening prior to the date of termination or thereafter, in the event the terms of said Original Agreement provide that anything shall or may be done after termination thereof.

22. This Agreement (including exhibits and other documents, manuals, etc. incorporated herein), together with previously acquired and recorded property rights if any, is the full and complete agreement between BNSF, STATE and SANBAG with respect to the subject matter herein and supersedes any and all other prior agreements between the parties hereto.

23. Any notice provided for herein or concerning this Agreement must be in writing and will be deemed sufficiently given when sent by certified mail, return receipt requested, to the parties at the following addresses:

BNSF Railway Company:

BNSF's Manager of Public Projects
740 E. Carnegie Drive
San Bernardino, CA. 92408
Email: Melvin.Thomas@bnsf.com

Director Structural Engineering
4515 Kansas Avenue
Kansas City, KS 66106
Email: Byron.Burns@bnsf.com

SANBAG:

San Bernardino Associated Governments
1170 W. 3rd Street, 2nd. Floor
San Bernardino, CA 92410
Attn. Director of Freeway Construction
Fax: 909 388 2002

STATE:

Department of Transportation
Division of Right of Way – Railroad Agreements
1120 N. Street, MS 37
Sacramento, CA. 95814

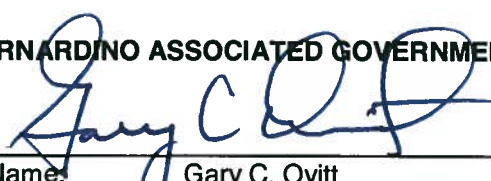
IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed and attested by its duly qualified and authorized officials as of the day and year first above written.

BNSF RAILWAY COMPANY

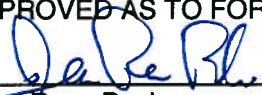
By:  1/17/09
Printed Name: David L. Freeman
Title: Vice President Engineering

WITNESS: 

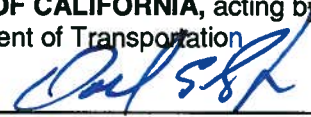
SAN BERNARDINO ASSOCIATED GOVERNMENTS

By: 
Printed Name: Gary C. Ovitt
Title: President - Board of Directors

APPROVED AS TO FORM:


Jean-Rene Basle
SANBAG Counsel

STATE OF CALIFORNIA, acting by and through its
Department of Transportation

By: 
Printed Name: Donald E. Grebe
Title: Chief, Office of Project Delivery
Division of Right of Way and Land Surveys


Attorney
Department of Transportation


Approval Recommended
Department of Transportation

EXHIBIT "A"
ATTACHED TO A CONTRACT BETWEEN
BNSF RAILWAY COMPANY
AND
THE STATE OF CALIFORNIA
AND
SAN BERNARDINO ASSOCIATED GOVERNMENTS

Begin Bridge

117.13'

141.08'

117.13'

End Bridge

25.58' Min. Vert. Clr.

Min. Horiz. Clr. 49.5'

15.6'

15.0'

14.17'

14.17'

Concrete Barrier Type 60E

FG

OG

Bent 2

Bent 3

Abut 1

Abut 4

Concrete Barrier Type 60D

26.25' Min. Vert. Clr.

Future BNSF Track 4

Ex. Trk 3

Ex. Trk 2

Ex. Trk 1

BVC 70+45.60 Elev 1144.45

EVC 75+86.94 Elev 1149.32

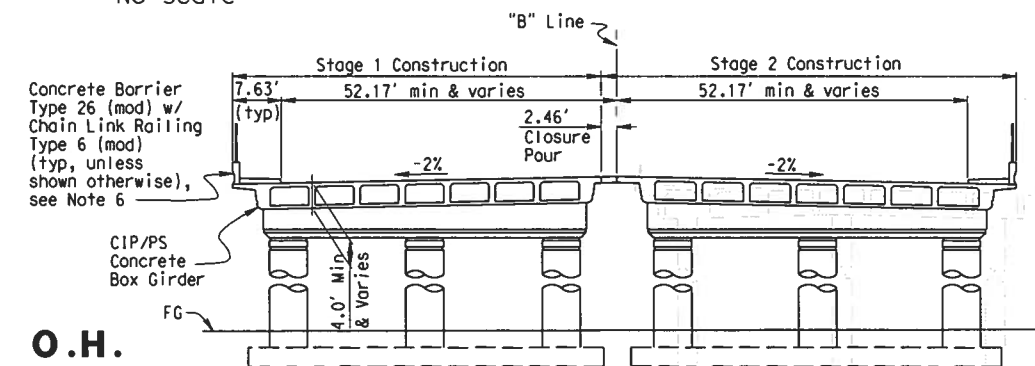
541.34' VC R = -7.152% / Sta

-5.000%

ELEVATION

1"=40'

No Scale


$$1'' = 30'$$

RECONSTRUCT THE EXISTING BASELINE STREET BRIDGE
OVER BNSF'S RAIL CORRIDOR AND TRACKS. NEW BRIDGE
APPROXIMATELY 120' WIDE AND 375' LONG.

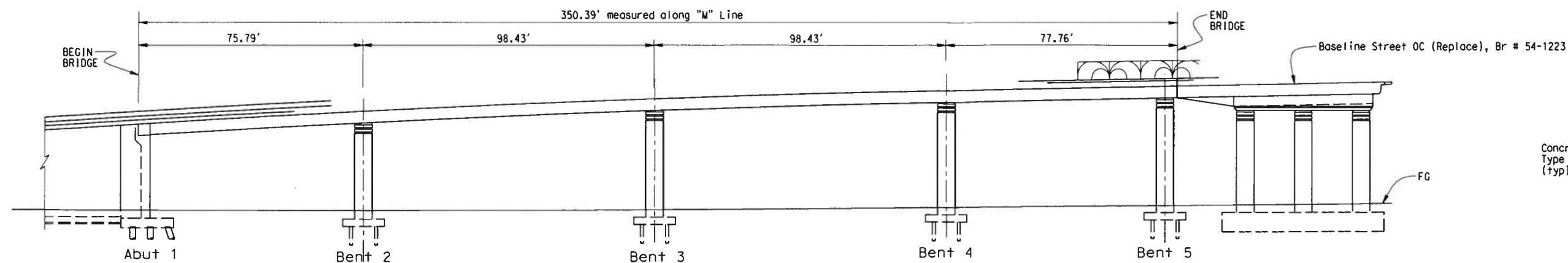
EXHIBIT "A" 1 of 3

File: X:\Projects\06-400-117\cadd\EXHIBITS\Base

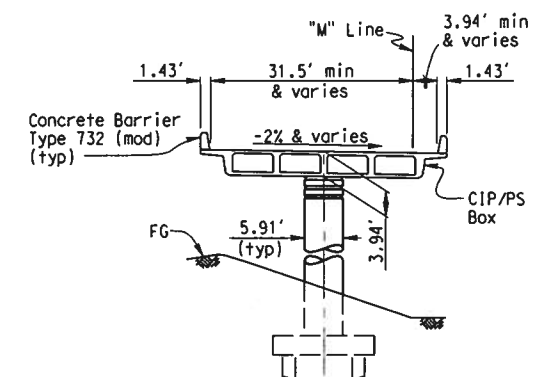
FORT WORTH, TEXAS
SCALE: AS NOTED
CALIFORNIA DIVISION
CAJON SUBDIVISION
LINE SEGMENT 7600

EXHIBIT "A"
ATTACHED TO A CONTRACT BETWEEN
BNSF RAILWAY COMPANY
AND
THE STATE OF CALIFORNIA
AND
SAN BERNARDINO ASSOCIATED GOVERNMENTS

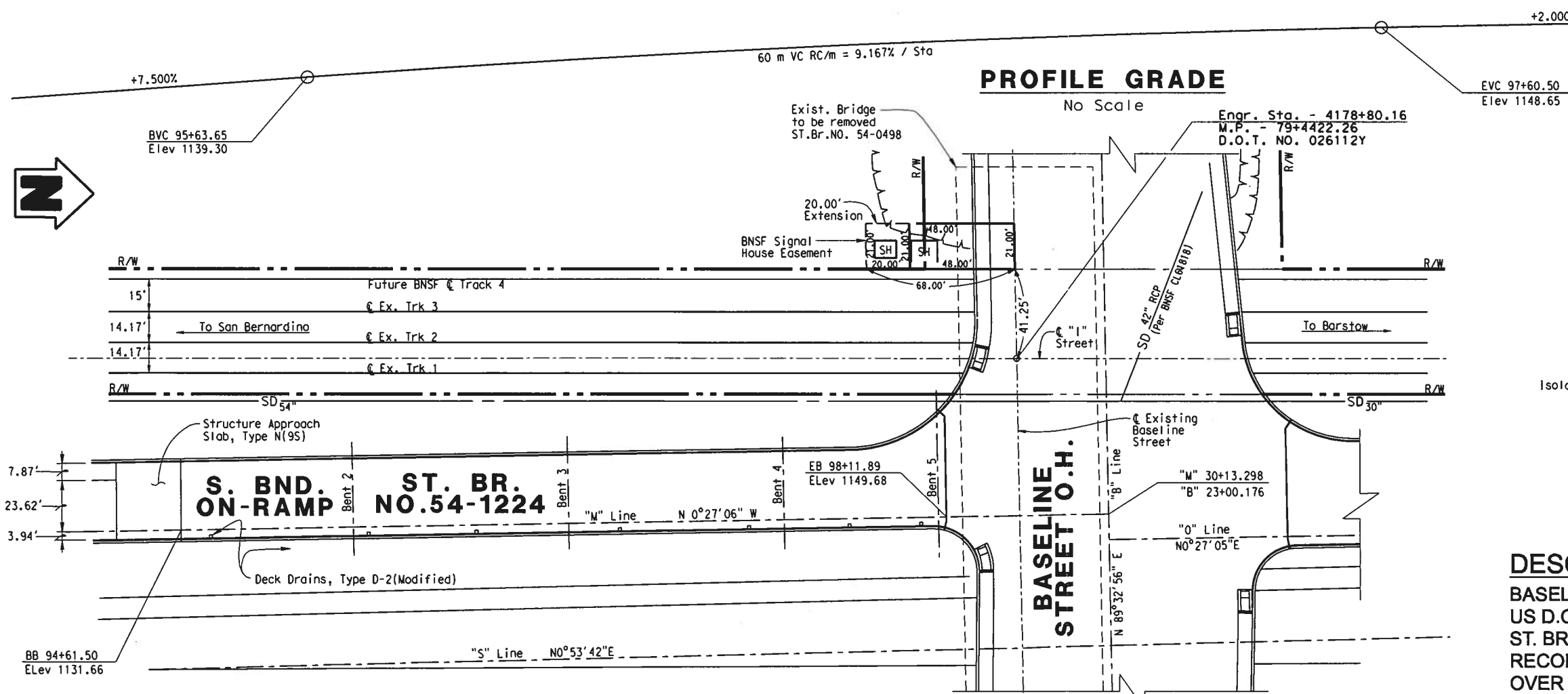
DAVID L. FREEMAN
VICE PRES. ENGINEERING



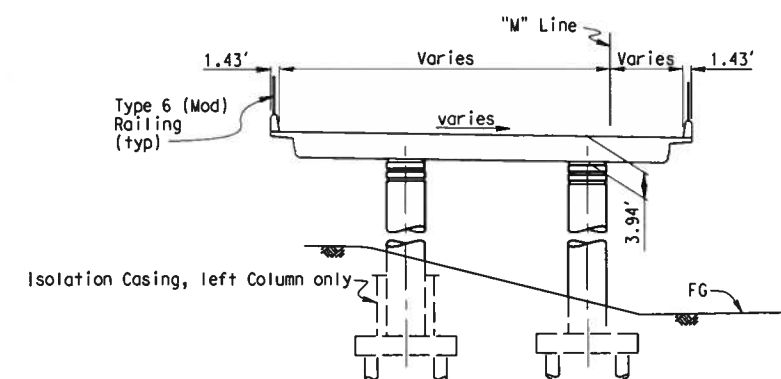
ELEVATION
1"=40'



TYPICAL SECTION
1"=30'



PLAN
1"=60'



TYPICAL SECTION @ BENT 5
1"=30'

DESCRIPTION

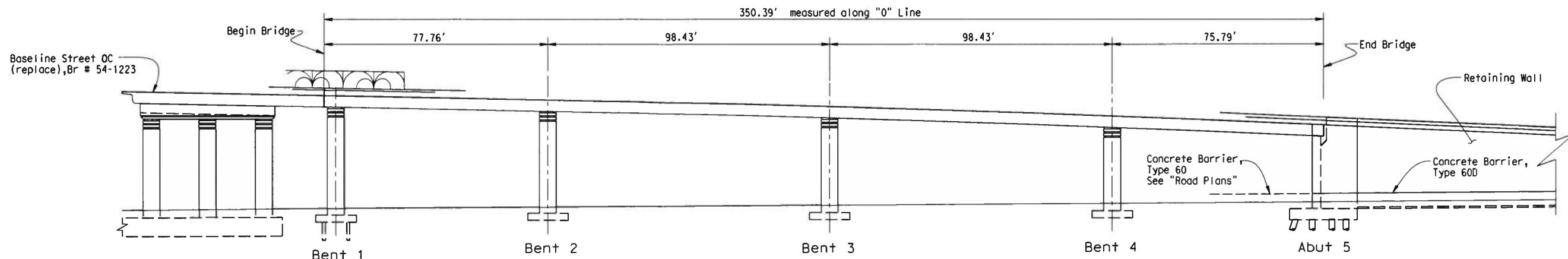
BASELINE STREET S BND. ON-RAMP
US D.O.T. NO. 026112Y
ST. BR. NO. 54-1224
RECONSTRUCT THE EXISTING BASELINE STREET BRIDGE
OVER BNSF'S RAIL CORRIDOR AND TRACKS. NEW BRIDGE
APPROXIMATELY 120' WIDE AND 375' LONG.

BASELINE STREET OVERHEAD

FORT WORTH, TEXAS
SCALE: AS NOTED
CALIFORNIA DIVISION
CAJON SUBDIVISION
LINE SEGMENT 7600

EXHIBIT "A"
ATTACHED TO A CONTRACT BETWEEN
BNSF RAILWAY COMPANY
AND
THE STATE OF CALIFORNIA
AND
SAN BERNARDINO ASSOCIATED GOVERNMENTS

DAVID L. FREEMAN
VICE PRES. ENGINEERING



ELEVATION

1"=40'

-2.000%

196.85' VC R = -4.000% / Sta

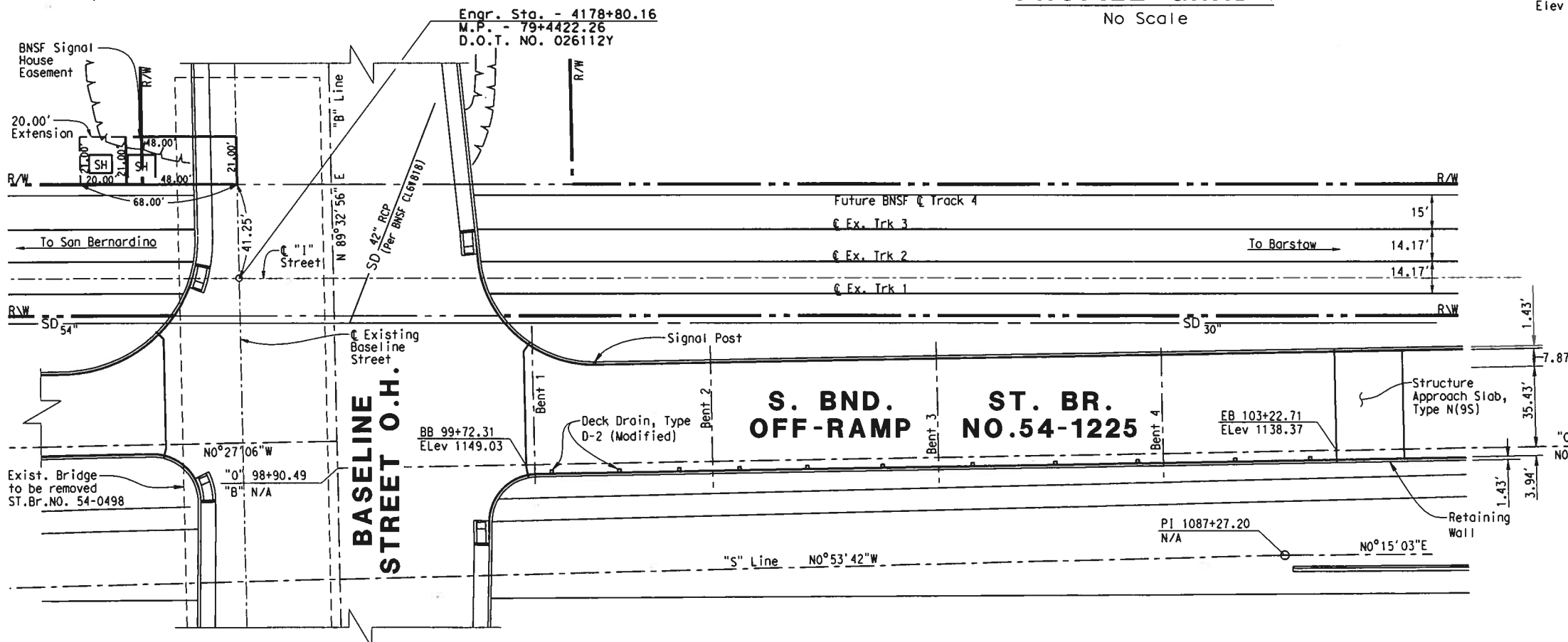
-4.400%

BVC 100+72.18
Elev 1147.03

EVC 102+69.03
Elev 1140.73

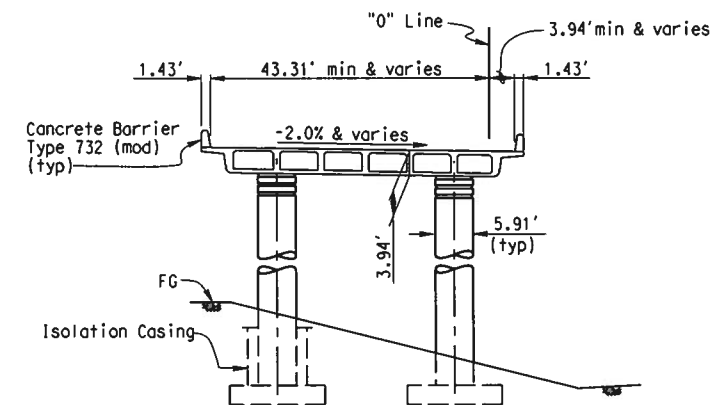
PROFILE GRADE

No Scale



PLAN

1"=60'



TYPICAL SECTION

1"=30'

DESCRIPTION

BASELINE STREET S. BND. OFF-RAMP
US. D.O.T. No 026112Y
ST. BR. NO. 54-1225
RECONSTRUCT THE EXISTING BASELINE STREET BRIDGE
OVER BNSF'S RAIL CORRIDOR AND TRACKS. NEW BRIDGE
APPROXIMATELY 120' WIDE AND 375' LONG.

BASELINE STREET OVERHEAD

EXHIBIT "B"

TEMPORARY CONSTRUCTION LICENSE

EXHIBIT B

**TEMPORARY CONSTRUCTION LICENSE
(Baseline Street Overhead)**

THIS TEMPORARY CONSTRUCTION LICENSE FOR the demolition, reconstruction and maintenance of the Baseline Street Overhead ("Temporary Construction License") is made and entered into as of the 29th day of April, 2009, by and between BNSF RAILWAY COMPANY, a Delaware corporation ("Licensor"), and **SAN BERNARDINO ASSOCIATED GOVERNMENTS**, a body corporate and politic of the State of California, ("Licensee").

A. Licensor owns or controls certain real property situated at or near the vicinity of San Bernardino, County of San Bernardino, State of California, at Mile Post 79.84, Line Segment 7600, [Project # Baseline Street Overhead], as described or depicted on Exhibit "A" and Exhibit "C", PARCEL MAP, Parcel No. 20627-2 and Parcel 20267-3 attached hereto and made a part hereof (the "Premises").

B. Licensor and Licensee have entered into that certain Overhead Agreement dated as of MARCH 4, 2009 concerning improvements on or near the Premises (the "Overhead Agreement").

C. Licensee has requested that Licensor grant to Licensee a temporary non-exclusive license over the Premises in connection with the demolition and reconstruction of the Baseline Street Overhead as defined in the Overhead Agreement.

D. Licensor has agreed to grant Licensee such license, subject to the terms and conditions hereinafter set forth.

NOW, THEREFORE, for and in consideration of the foregoing recitals which are incorporated herein, the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

Section 1 Granting of License.

- 1.1 License Purpose. Licensee shall use the Premises for such purposes as are necessary and incidental to the demolition and reconstruction of the Baseline Street Overhead as is set forth in the Overhead Agreement.
- 1.2 Grant. Licensor does hereby grant unto Licensee a temporary non-exclusive license ("License") over the Premises for the License Purpose and for no other purpose. The License is granted subject to any and all restrictions, covenants, easements, licenses, permits, leases and other encumbrances of whatsoever nature whether or not of record, if any, relating to the Premises and subject to all with all applicable federal, state and local laws, regulations, ordinances, restrictions, covenants and court or administrative decisions and orders, including Environmental Laws (defined below) and zoning laws (collectively, "Laws"). Licensee may not make any alterations or improvements or perform any maintenance or repair activities within the Premises except in accordance with the terms and conditions of the Overhead Agreement.

1.3 Reservations by Licensor. Licensor excepts and reserves the right, to be exercised by Licensor and any other parties who may obtain written permission or authority from Licensor:

- (a) to install, construct, maintain, renew, repair, replace, use, operate, change, modify and relocate any existing pipe, power, communication, cable, or utility lines and appurtenances and other facilities or structures of like character (collectively, "Lines") upon, over, under or across the Premises;
- (b) to install, construct, maintain, renew, repair, replace, use, operate, change, modify and relocate any tracks or additional facilities or structures upon, over, under or across the Premises; and
- (c) to use the Premises in any manner as the Licensor in its sole discretion deems appropriate, provided Licensor uses all reasonable efforts to avoid material interference with the use of the Premises by Licensee for the License Purpose.

Section 2 Term of License. The term of the Temporary Construction License shall be for a term beginning on the authorized commencement date as set forth in Article III, Section 11 (c) ("Effective Date") of said Overhead Agreement and ending on the earlier of (i) completion of the Project, or (ii) Thirty (30) months following the Effective Date of the Temporary Construction License, whichever occurs first. Said Temporary Construction License may be extended upon the written consent of both parties for an additional fee.

Section 3 No Warranty of Any Conditions of the Premises. Licensee acknowledges that Licensor has made no representation whatsoever to Licensee concerning the state or condition of the Premises, or any personal property located thereon, or the nature or extent of Licensor's ownership interest in the Premises. Licensee has not relied on any statement or declaration of Licensor, oral or in writing, as an inducement to entering into this Temporary Construction License, other than as set forth herein. LICENSOR HEREBY DISCLAIMS ANY REPRESENTATION OR WARRANTY, WHETHER EXPRESS OR IMPLIED, AS TO THE DESIGN OR CONDITION OF ANY PROPERTY PRESENT ON OR CONSTITUTING THE PREMISES, ITS MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, THE QUALITY OF THE MATERIAL OR WORKMANSHIP OF ANY SUCH PROPERTY, OR THE CONFORMITY OF ANY SUCH PROPERTY TO ITS INTENDED USES. LICENSOR SHALL NOT BE RESPONSIBLE TO LICENSEE OR ANY OF LICENSEE'S CONTRACTORS FOR ANY DAMAGES RELATING TO THE DESIGN, CONDITION, QUALITY, SAFETY, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY PROPERTY PRESENT ON OR CONSTITUTING THE PREMISES, OR THE CONFORMITY OF ANY SUCH PROPERTY TO ITS INTENDED USES. LICENSEE ACCEPTS ALL RIGHTS GRANTED UNDER THIS TEMPORARY CONSTRUCTION LICENSE IN THE PREMISES IN AN "AS IS, WHERE IS" AND "WITH ALL FAULTS" CONDITION, AND SUBJECT TO ALL LIMITATIONS ON LICENSOR'S RIGHTS, INTERESTS AND TITLE TO THE PREMISES. Licensee has inspected or will inspect the Premises, and enters upon Licensor's rail corridor and property with knowledge of its physical condition and the danger inherent in Licensor's rail operations on or near the Premises. Licensee acknowledges that this Temporary Construction License does not contain any implied warranties that Licensee or Licensee's Contractors (as hereinafter defined) can successfully construct or operate the Improvements.

Section 4 Nature of Licensor's Interest in the Premises. LICENSOR DOES NOT WARRANT ITS TITLE TO THE PREMISES NOR UNDERTAKE TO DEFEND LICENSEE IN THE PEACEABLE POSSESSION OR USE THEREOF. NO COVENANT OF QUIET ENJOYMENT IS MADE. In case of the eviction of Licensee by anyone owning or claiming title to or any interest in the Premises, or by the abandonment by Licensor of the affected rail corridor, Licensor shall not be liable to refund Licensee any compensation paid hereunder.

Section 5 Improvements. Licensee shall take, in a timely manner, all actions necessary and proper to the lawful establishment, construction, operation, and maintenance of the Improvements, including such actions as may be necessary to obtain any required permits, approvals or authorizations from applicable governmental authorities. Any and all cuts and fills, excavations or embankments necessary in the construction, maintenance, or future alteration of the Improvements shall be made and maintained in such manner, form and extent as will provide adequate drainage of and from the adjoining lands and premises of the Licensor; and wherever any such fill or embankment shall or may obstruct the natural and pre-existing drainage from such lands and premises of the Licensor, the Licensee shall construct and maintain such culverts or drains as may be requisite to preserve such natural and pre-existing drainage, and shall also wherever necessary, construct extensions of existing drains, culverts or ditches through or along the premises of the Licensor, such extensions to be of adequate sectional dimensions to preserve the present flowage of drainage or other waters, and of materials and workmanship equally as good as those now existing. In the event any construction, repair, maintenance, work or other use of the Premises by Licensee will affect any Lines, fences, buildings, improvements or other facilities (collectively, "Other Improvements"), Licensee will be responsible at Licensee's sole risk to locate and make any adjustments necessary to such Other Improvements. Licensee must contact the owner(s) of the Other Improvements notifying them of any work that may damage these Other Improvements and/or interfere with their service and obtain the owner's written approval prior to so affecting the Other Improvements. Licensee must mark all Other Improvements on the Plans and Specifications and mark such Other Improvements in the field in order to verify their locations. Licensee must also use all reasonable methods when working on or near Licensor's property to determine if any Other Improvements (fiber optic, cable, communication or otherwise) may exist.

Section 6 Taxes. Licensee shall pay when due any taxes, assessments or other charges (collectively, "Taxes") levied or assessed upon the Improvements by any governmental or quasi-governmental body or any Taxes levied or assessed against Licensor or the Premises that are attributable to the Improvements. In the event of Licensee's failure to do so, if Licensor shall become obligated to do so, Licensee shall be liable for all costs, expenses and judgments to or against Licensor, including all of Licensor's legal fees and expenses.

Section 7 Environmental. Licensee shall be bound by and hereby agrees to the environmental provisions set forth in Exhibit B-1, Exhibit C, and Exhibit G, which are attached to and made a part of the Overhead Agreement as if fully set forth herein.

Section 8 Default and Termination.

8.1 Licensor's Performance Rights. If at any time Licensee, or Licensee's Contractors, fails to properly perform its obligations under this Temporary Construction License, Licensor, in its sole discretion, may: (i) seek specific performance of the unperformed obligations, or (ii) at Licensee's sole cost, may arrange for the performance of such work as Licensor deems necessary for the safety of its rail operations, activities and property, or to avoid or remove any interference with the activities or property of Licensor, or anyone or anything present on the rail corridor or property with the authority or permission of Licensor. Licensee shall promptly reimburse Licensor for all costs of work performed on Licensee's behalf upon receipt of an invoice for such costs. Licensor's failure to perform any obligations of Licensee or Licensee's Contractors shall not alter the liability allocation set forth in this Temporary Construction License.

8.2 Effect of Termination or Expiration. Neither termination nor expiration will release Licensee from any liability or obligation under this License, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination or expiration, or, if later, the date the Premises are restored as required by Section 9.

8.3 Non-exclusive Remedies. The remedies set forth in this Section 8 shall be in

addition to, and not in limitation of, any other remedies that Licensor may have under the Overhead Agreement, at law or in equity.

Section 9 **Surrender of Premises.** If said described premises, or any part thereof, shall at any time cease to be used by said Licensee, or by the public, for the purpose, as aforesaid for a period of two (2) consecutive years, or should they be converted to any other use whatsoever, or should the Licensee fail to perform any of the conditions herein expressed, then upon written request by the Licensor, Licensee shall immediately request abandonment in accordance with the applicable statutes or laws of the State of California, and, subject to appropriations being made for the purpose by the California Transportation Commission, Licensee shall restore Premises to their prior condition.

Section 10 **Liens.** Licensee shall promptly pay and discharge any and all liens arising out of any construction, alterations or repairs done, suffered or permitted to be done by Licensee on the Premises or attributable to Taxes that are the responsibility of Licensee pursuant to Section 6. Licensor is hereby authorized to post any notices or take any other action upon or with respect to the Premises that is or may be permitted by Law to prevent the attachment of any such liens to any portion of the Premises; provided, however, that failure of Licensor to take any such action shall not relieve Licensee of any obligation or liability under this Section 10 or any other section of this Temporary Construction License.

Section 11 **Tax Exchange.** Licensor reserves the right to assign this Temporary Construction License to Apex Property & Track Exchange, Inc. ("Apex"). Apex is a qualified intermediary within the meaning of Section 1031 of the Internal Revenue Code of 1986, as amended, and Treas. Reg. § 1.1031(k)-1(g), for the purpose of completing a tax-deferred exchange under said Section 1031. Licensor shall bear all expenses associated with the use of Apex, or necessary to qualify this transaction as a tax-deferred exchange, and, except as otherwise provided herein, shall protect, reimburse, indemnify and hold harmless Licensee from and against any and all reasonable and necessary additional costs, expenses, including, attorneys fees, and liabilities which Licensee may incur as a result of Licensor's use of Apex or the qualification of this transaction as a tax-deferred transaction pursuant to Section 1031. Licensee shall cooperate with Licensor with respect to this tax-deferred exchange, and upon Licensor's request, shall execute such documents as may be required to effect this tax-deferred exchange.

Section 12 **Notices.** Any notice required or permitted to be given hereunder by one party to the other shall be delivered in the manner set forth in the Overhead Agreement. Notices to Licensor under this License shall be delivered to the following address: BNSF Railway Company, Real Estate Department, 2500 Lou Menk Drive, Ft. Worth, TX 76131, Attn: Permits, or such other address as Licensor may from time to time direct by notice to Licensee.

Section 13 **Recordation.** It is understood and agreed that this Temporary Construction License shall not be recorded.

Section 14 **Miscellaneous.**

14.1 All questions concerning the interpretation or application of provisions of this Temporary Construction License shall be decided according to the substantive laws of the State of California without regard to conflicts of law provisions.

14.2 In the event that Licensee consists of two or more parties, all the covenants and agreements of Licensee herein contained shall be the joint and several covenants and agreements of such parties. This instrument and all of the terms, covenants and provisions hereof shall inure to the benefit of and be binding upon each of the parties hereto and their respective legal representatives, successors and assigns and shall run with and be binding upon the Premises.

14.3 If any action at law or in equity is necessary to enforce or interpret the terms of this Temporary Construction License, the prevailing party or parties shall be entitled to reasonable attorneys' fees, costs and necessary disbursements in addition to any other relief to which such party or parties may be entitled.

14.4 If any provision of this Temporary Construction License is held to be illegal, invalid or unenforceable under present or future Laws, such provision will be fully severable and this Temporary Construction License will be construed and enforced as if such illegal, invalid or unenforceable provision is not a part hereof, and the remaining provisions hereof will remain in full force and effect. In lieu of any illegal, invalid or unenforceable provision herein, there will be added automatically as a part of this Temporary Construction License a provision as similar in its terms to such illegal, invalid or unenforceable provision as may be possible and be legal, valid and enforceable.

14.5 This Temporary Construction License is the full and complete agreement between Licensors and Licensee with respect to all matters relating to Licensee's use of the Premises, and supersedes any and all other agreements between the parties hereto relating to Licensee's use of the Premises as described herein. However, nothing herein is intended to terminate any surviving obligation of Licensee or Licensee's obligation to defend and hold Licensors harmless in any prior written agreement between the parties.

14.6 Time is of the essence for the performance of this Temporary Construction License.

14.7 The terms of the Overhead Agreement are incorporated herein as if fully set forth in this instrument which terms shall be in full force and effect for purposes of this License.

Witness the execution of this Temporary Construction License as of the date first set forth above.

LICENSOR:

BNSF RAILWAY COMPANY, a Delaware corporation

By: 

Name: David P. Schneider

Title: General Director - Land Revenue Management

LICENSEE:

SAN BERNARDINO ASSOCIATED GOVERNMENTS

a body corporate and political of the State of California

By: 

Printed Name: Gary C. Ovitt

Title: President - Board of Directors

EXHIBIT "A"

08-SBd-215-13.00 (KP)
#20627-2

Parcel 20627-2

A temporary easement for construction purposes and incidents thereto, over, under and across that portion of that certain street commonly known as "I" Street, 25.146 meters (82.50 feet) wide, as shown on the map of Leonard Acres, in the City of San Bernardino, County of San Bernardino, State of California, filed in Book 21, page 69 of Maps, in the Office of the County Recorder of said county, described as follows:

COMMENCING at the southeast corner of Lot 17 of said map; thence along the east line of said Lot 17, also being the west right of way of said "I" Street, North 00°24'33" West, 21.541 meters (70.67 feet) to the **POINT OF BEGINNING**; thence continuing along said east line and said right of way, North 00°24'33" West, 14.153 meters (46.43 feet); thence South 89°44'57" East, 17.449 meters (57.25 feet) to the west right of way of State Route 215; thence along said west right of way of State Route 215, South 00°25'12" East, 8.375 meters (27.48 feet) to the beginning of a non-tangent curve concave northwesterly, having a radius of 10.585 meters (34.73 feet) a radial line bears South 57°16'58" East; thence southwesterly along said non-tangent curve through a central angle of 52°14'07" an arc distance of 9.650 meters (31.66 feet); thence South 84°41'16" West, 9.476 meters (31.09 feet) to the **POINT OF BEGINNING**.

08-SBd-215-13.00 (KP)
#20627-3

Parcel 20627-3

A temporary easement for construction purposes and incidents thereto, over, under and across that portion of that certain street commonly known as "I" Street, 25.146 meters (82.50 feet) wide, in the City of San Bernardino, County of San Bernardino, State of California, as shown by the Map of the Survey of San Bernardino Rancho, filed in Book 7, page 2, County Recorder of said County, described as follows:

BEGINNING at the northeast corner Lot 1 of Block 20 as shown on said Map; thence along the east line of said Block 20, also being the west right of way of said "I" Street, South 00°25'28" East, 12.419 meters (40.75 feet); thence South 89°44'57" East, 17.456 meters (57.27 feet) to the west right of way of State Route 215; thence along said west right of way of State Route 215, North 00°25'12" West, 6.646 meters (21.81 feet) to the beginning of a non-tangent curve concave southwesterly having a radius of 13.280 meters (43.57 feet) a radial line bears North 59°44'56" East; thence northwesterly along said non-tangent curve through a central angle of 60°11'38" an arc distance of 13.952 meters (45.77 feet); thence South 89°32'56" West, 5.930 meters (19.45 feet); thence South 00°25'01" East, 0.693 meters (2.27 feet) to the **POINT OF BEGINNING**.

The bearings and distances used in the above descriptions of parcels 20627-2 and 20627-3 are based on the California Coordinate System of 1983, Zone 5. Multiply distances shown by 1.000068345 to obtain ground level distances.

These real property descriptions have been prepared by me, or under my direction, in conformance with the Professional Land Surveyors Act.

Signature: _____

Professional Land Surveyor

Date: _____

Nov. 25, 2008



DIST.	COUNTY	ROUTE	KILOMETER POST
08	88d.	215	13.00



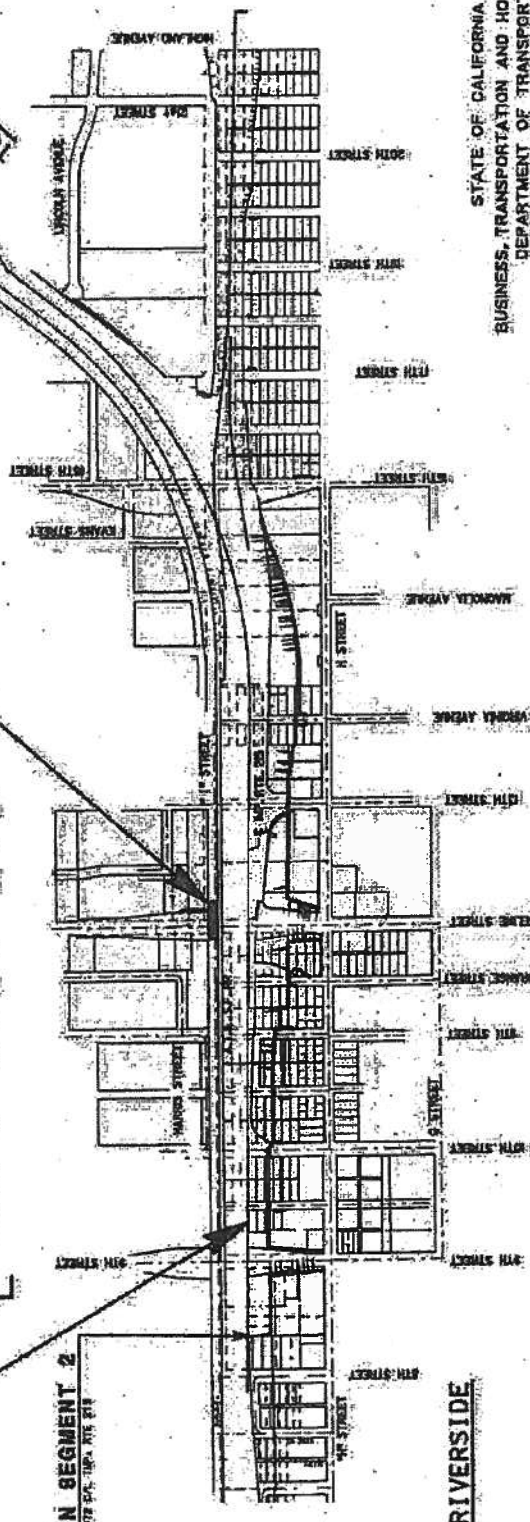
EXHIBIT "C" **SHEET 1 OF 2**

**PARCEL No. 8
 20627-2 & 20627-3**

Q IMP. RTE. 215

END SEGMENT 2
 12400' IMP. C/L IMP. RTE 215

BEGIN SEGMENT 2
 12400' IMP. C/L IMP. RTE 215



STATE OF CALIFORNIA
 BUSINESS, TRANSPORTATION AND HOUSING AGENCY
 DEPARTMENT OF TRANSPORTATION

RANCHO SAN BERNARDINO
M.B. 7 / 2

PARCEL INDEX MAP

**CITY OF
 SAN BERNARDINO**

NO SCALE

DIST.	COUNTY	ROUTE	KILOMETER POST
08	Sbd	215	13.00

EXHIBIT "C"

SHEET 2 OF 2

CONVERGENCE ANGLE - 0°21'50.2"
SBD 215-808 CANT BRASS DISK
IN SLY SIDEWALK BASELINE
OF - 0.99953-4939

LEONARD ACRES
SUBDIVISION
MB 21/69



Q IMP. BASELINE STREET

22+31.4926 EG
Q BASELINE

RANCHO
SAN BERNARDINO
MB 7/2

LOT 1
BLK 20

LOT 17

N0°25'01"W
0.693m (2.27')

N0°25'28"W
12.419m (40.75')

N89°44'57"W
17.456m (57.27')

N0°25'12"W
6.646m (21.81')

N59°44'56"E (RBL)
N89°44'56"E (RBL)

N89°32'56"E
5.930m (19.45')

N84°41'16"E
9.476m (31.09')

N89°44'57"W
17.449m (57.25')

Q 1" STREET

S57°16'58"E (RB)

N0°25'12"W
8.375m (27.48')

P.O.B.
N0°24'33"W
14.153m (46.43')

P.O.C.
(20627-2)
N0°24'33"W
21.541m (70.67')

12.573m
(41.25')

12.573m
(41.25')

EXIST. R/W

PARCEL No. 20627-2

PARCEL No. 20627-3

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

PARCEL MAP

CURVE DATA		
NO.	Δ	LENGTH
①	52°14'07"	10.585m (34.73')
②	60°11'38"	13.280m (43.57')



EXHIBIT “B-1”

EASEMENT

WHEN RECORDED MAIL TO:

Recorded in Official Records,
County of San Bernardino
Doc#: 2009-0185335
4/30/2009 2:09 PM

Betty Bobosik, Chief
Department of Transportation
Right of Way Railroad Coordinator
Dist. 07, D-08
464 W. 4th St., 6th Floor MS-M
San Bernardino, CA 92401-1400

MAIL TAX STATEMENTS TO:

SPACE ABOVE THIS LINE FOR RECORDER'S USE

DOCUMENTARY TRANSFER TAX \$ _____

...Computed on the consideration or value of Property conveyed, OR
...Computed on the consideration or value less liens or encumbrances
remaining at time of sale.

RECORDER: Please make no
charge for recording the attached instru-
ment per Govt. Code Sec. 6103. It is being
recorded in connection with a Governmental
Agency transaction _____

Signature of Declarant or Agent determining Tax - Firm Name

EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that **BNSF RAILWAY COMPANY**, (formerly known as The Burlington Northern and Santa Fe Railway Company and successor by merger to The Atchison, Topeka and Santa Fe Railway Company) a Delaware corporation, whose address for purposes of this instrument is 2500 Lou Menk Drive, Fort Worth, Texas 76131-2830, Grantor, for Thirty Four Thousand Six Hundred Seventy One and No/100 Dollars (**\$34,671.00**) to it paid by **STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION**, Grantee, and the promises of the Grantee hereinafter specified, does hereby grant unto the Grantee, subject to the terms and conditions hereinafter set forth, an **EASEMENT** for the purpose of constructing, reconstructing, removing, replacing, inspecting, repairing, maintaining and operating an overhead structure supporting columns and footings, including any and all appurtenances thereto, over, under, upon and across the described real property, together with all abutter's rights of access to and from Grantor's remaining property to the structure, and for no other purpose, located at Railroad Mile Post 79.84, Line Segment 7600, hereinafter called Structure, over, upon and across the premises, situated in the City of San Bernardino, County of San Bernardino, State of California, being more particularly described on Exhibit "A" and shown on Exhibit "B" PARCEL MAP, Parcel No. 20627-1, attached hereto and by this reference made a part hereof.

ALSO, TOGETHER with the non-exclusive right of access to the easement hereinabove described by way of such roads or passageways as may now or hereafter exist on Grantor's remaining property; provided, however, that Grantee's exercise of such right of access shall not unreasonably interfere with Grantor's use of such roads or passageways, and subject to advance notification, and coordination with Grantor.

RESERVING, however, unto the Grantor, its successors and assigns, all rights in and to airspace at an elevation higher than a plane parallel with and thirty (30) feet above the roadway surface of said structure as originally constructed, and the right to construct, place, operate, maintain, alter, repair, replace, renew, improve and remove communication lines above, below and on the surface of the premises, including, without limitation, transmission by conduit, fiber optics, cable, wire or other means of electricity, voice data, video, digitized information, or other materials or information, pipelines, utility lines, track and facilities including the right of ingress and egress, in any such manner as does not unreasonably interfere with Grantee's use, enjoyment, safety and compatibility of the premises for said Structure, and further reserving unto Grantor, its successors and assigns, all right and privilege of ingress

and egress to said premises as Grantor, its successors and assigns may require to investigate and remediate environmental contamination and hazards, and further reserving the right and privilege to use said land for any and all purposes not inconsistent with the use, enjoyment, safety and compatibility thereof for said Structure.

This easement is subject and subordinate to the continuing right and obligation of Grantor, its successors and assigns, to use the area of land under the Structure in the performance of its public duty as a common carrier, and for that purpose Grantor expressly reserves for itself and its successors and assigns, the right to construct, reconstruct, maintain and operate existing or any additional railroad tracks, facilities and appurtenances thereto upon, along and across the area of land under the Structure in such manner as may be consistent with Grantee's use and enjoyment of the easement herein granted; provided, further, that in the event the area of land under the Structure is transferred to a non-transportation entity, such transferee's use of the land under the Structure shall be subject to the following limitations and conditions:

1. No use may be made of the area of land under the easement hereinabove described which would impair the full use and safety of said Structure, or would otherwise interfere with the free flow of traffic thereon or would unreasonably impair the maintenance thereof.
2. No use may be made of the area of land under said easement hereinabove described for the manufacture or storage of flammable, volatile, explosive or corrosive substances, and such substances shall not be brought onto said land except in such quantities as are normally required for the maintenance operations of occupants of said land and except as may be transported by rail or pipelines. Installation of any pipelines carrying volatile substances shall have the written approval of the Grantee as to the safety and compatibility with structure purposes and such discretion shall not be exercised in a capricious or arbitrary manner. The use of any such substances shall be in conformance with all applicable code requirements.
3. No hazardous or unreasonably objectionable smoke, fumes, vapors, dust or odors shall be permitted, which would adversely affect the use or maintenance of said Structure or the traveling public thereon.
4. No building of combustible construction shall hereafter be constructed on the area of land under the easement hereinabove described. The Grantee shall be given the opportunity to review and approve plans for any construction within said easement area 60 days prior to said construction. No buildings, no permanent structures, and no advertising displays, may be constructed within fifteen (15) feet (measured horizontally) of the sides of said structure without the express written approval of the Grantee. The Grantee shall have the discretion to determine whether such proposed construction will be inimical to or incompatible with the full enjoyment of the public rights in the Structure or against the public interest, but such discretion shall not be exercised in a capricious or arbitrary manner.

The foregoing easement is further made subject to and upon the following express conditions:

1. To existing interests in the above-described premises to whomsoever belonging and of whatsoever nature and any and all extensions and renewals thereof, including but not limited to underground pipe line or lines, or any type of wire line or lines, if any.
2. Any and all cuts and fills, excavations or embankments necessary in the construction, maintenance, or future alteration of said Structure shall be made and maintained in such manner, form and extent as will provide adequate drainage of and from the adjoining lands and premises of the Grantor; and wherever any such fill or embankment shall or may obstruct the natural and pre-existing drainage from such lands and premises of the Grantor, the Grantee shall construct and maintain such culverts or drains as may be requisite to preserve such natural and pre-existing drainage, and shall also wherever necessary, construct extensions of existing drains, culverts or ditches through or along the premises of the

Grantor, such extensions to be of adequate sectional dimensions to preserve the present flowage of drainage or other waters, and of materials and workmanship equally as good as those now existing.

3. The Grantee shall bear the cost of removal, relocation or reconstruction of any and all right of way fences, telephone or telegraph poles, or other facilities, the removal, relocation or reconstruction of which may be made necessary by reason of the use of said premises for said Structure purposes.
4. The Grantee shall, at its own cost and expense, make adjustment with industries or other lessees of Grantor for buildings or improvements that may have to be relocated, reconstructed or destroyed by reason of the construction and maintenance of said Structure on said premises.
5.
 - a. If during the construction or subsequent maintenance of said Structure, soils or other materials considered to be environmentally contaminated are exposed within the easement area, Grantee will promptly notify Grantor and will remove to the depth and width necessary to fully remediate said exposure and safely dispose of said contaminated soils and/or materials. If requested by Grantor, such soil shall be replaced with clean fill. Grantee shall indemnify, protect and defend the Grantor from any and all liability, claims or demands, if any, which arise as a result of exposure and/or removal of said contaminated soils or materials by Grantee. Liability for the management and removal of existing contaminated soils or materials, if any, within the easement area that are not disturbed by Grantee's construction or maintenance of its project, other than those soils necessary to fully remediate any disturbance caused by such construction or maintenance, shall remain the sole responsibility of the Grantor. Determination of soils contamination and applicable disposal procedures thereof, will be made only by an agency having the capacity and authority to make such a determination.
 - b. In the event that excavated soil or material is to be removed and transported off-site, Grantee shall, prior to any removal and/or transport, present for Engineer's review, an acceptable environmental management plan ("EMP"). Grantee must obtain written consent from Engineer prior to removal and/or transportation of Excavated Material. Such consent shall not constitute approval of the chosen removal or transportation methodology, or whether the EMP complies with any or all local, state, federal or engineering standards.
6. Grantor and Grantee have entered into that certain Overhead Agreement dated as of MARCH 4, 2009 concerning the Premises (the "Overhead Agreement"). The terms of the Overhead Agreement, as may be amended from time to time, are incorporated herein as if fully set forth in this instrument which terms shall be in full force and effect for purposes of this Easement even if the Overhead Agreement is, for whatever reason, no longer in effect.
7. Grantee shall pay when due any taxes, assessments or other charges (collectively, "**Taxes**") levied or assessed upon the Improvements by any governmental or quasi-governmental body or any Taxes levied or assessed against Grantor or the Premises that are attributable to the Improvements. Grantee agrees to purchase, affix and cancel any and all documentary stamps in the amount prescribed by statute, and to pay any and all required transfer taxes, excise taxes and any and all fees incidental to recordation of the Easement. In the event of Grantee's failure to do so, if Grantor shall become obligated to do so, Grantee shall be liable for all costs, expenses and judgments to or against Grantor, including all of Grantor's legal fees and expenses.
8. The Grantee or its contractor(s) shall telephone Grantor's Communication Network Control Center at **(800) 533-2891** (a 24 hour number) to determine if fiber optic cable is buried anywhere on the premises; and if so, the Grantee or its contractor(s) will contact the Telecommunications Company(ies) involved, and make arrangements with the Telecommunications Company(ies) for protection of the fiber optic cable prior to beginning any work on the premises.

9. If said described premises, or any part thereof, shall at any time voluntarily cease to be used by said Grantee, or by the public, for the purpose, as aforesaid for a period of two (2) consecutive years, or should they be converted to any other use whatsoever, or should the Grantee fail to perform any of the conditions herein expressed after notice and a reasonable opportunity to cure, then upon written request by the Grantor, Grantee shall immediately request abandonment in accordance with the applicable statutes or laws of the State of California, and, subject to appropriations being made for the purpose by the California Transportation Commission, Grantee shall, remove said structure and restore Railroad's premises to the condition existing prior to construction of said structure.
10. The Grantor does not warrant its title to said premises nor undertake to defend the Grantee in the peaceable possession, use or enjoyment thereof; and the grant herein made is subject to all outstanding rights or interest of others, including the tenants and licensees of the Grantor.
11. This easement shall be binding upon and inure to the benefit of the heirs, executors, administrators, assigns and successors of Grantor and Grantee.

TO HAVE AND TO HOLD THE SAME, together with all the hereditaments and appurtenances thereunto belonging to Grantee for public use and enjoyment for the purposes aforesaid and for no other purpose whatsoever subject to the terms and conditions hereinbefore stated.

The Grantor, for itself, its successors and assigns, hereby waives any claim for any and all damages to grantor's remaining property contiguous to the right of way hereby conveyed by reason of the location, construction or maintenance of said highway.

IN WITNESS WHEREOF, the said **BNSF RAILWAY COMPANY** has caused this instrument to be signed by its authorized officer, and the corporate seal affixed on the 24th day of APRIL, 2008.

BNSF RAILWAY COMPANY

By:

David P. Schneider

David P. Schneider
General Director-
Land Revenue Management

ATTEST:

By:

Patricia Zbichorski

Patricia Zbichorski
Assistant Secretary



STATE OF TEXAS

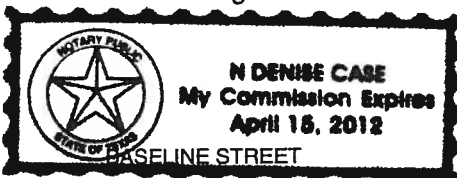
)

) ss.

COUNTY OF TARRANT

)

On this 24th day of APRIL, 2008, before me, the undersigned, a Notary Public in and for said County and State, personally appeared David P. Schneider and Patricia Zbichorski, known to me to be General Director-Land Revenue Management and Assistant Secretary, respectively, of the corporation that executed the within instrument on behalf of the Corporation therein named, and acknowledged to me that such Corporation executed the same.

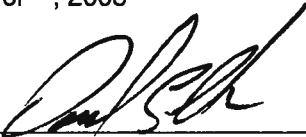


Denise Case
Notary's Signature

My Commission Expires: April 15, 2012

THIS IS TO CERTIFY, That the State of California, acting by and through the Department of Transportation (pursuant to Government Code Section 27281), hereby accepts for public purposes the real property described in the within deed and consents to the Recording thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this day of , 2008



Director of Transportation

FORM APPROVED BY LAW

EXHIBIT "A"

08-SBd-215-13.00 (KP)

#20627-1

Parcel 20627-1

An easement for freeway purposes, over, under, upon and across that portion of those certain streets commonly known as Baseline and "T" Streets, 25.146 meters (82.50 feet) wide, as shown on the map of Leonard Acres, in the City of San Bernardino, County of San Bernardino, State of California, filed in Book 21, page 69 of Maps, in the Office of the County Recorder of said county, described as follows:

BEGINNING at the southeast corner of Lot 17 of said map; thence along the east line of said Lot 17, also being the west right of way of said "T" Street, North $00^{\circ}24'33''$ West, 21.541 meters (70.67 feet); thence North $84^{\circ}41'16''$ East, 9.476 meters (31.09 feet) to the beginning of a non-tangent curve concave northwesterly, having a radius of 10.585 meters (34.73 feet) a radial line bears South $5^{\circ}02'51''$ East; thence northeasterly along said non-tangent curve through a central angle of $52^{\circ}14'07''$ an arc distance of 9.650 meters (31.66 feet) to the point of cusp and the westerly right of way of State Route 215; thence along last said right of way, South $00^{\circ}25'12''$ East, 58.238 meters (191.07 feet) to the point of cusp and beginning of a non-tangent curve concave southwesterly, having a radius of 13.280 meters (43.57 feet) a radial line bears North $59^{\circ}44'56''$ East; thence northwesterly along said non-tangent curve through a central angle of $60^{\circ}11'38''$ an arc distance of 13.952 meters (45.77 feet); thence South $89^{\circ}32'56''$ West, 5.930 meters (19.45 feet); thence North $00^{\circ}25'10''$ West, 24.453 meters (80.23 feet) to the **POINT OF BEGINNING**.

The bearings and distances used in the above description are based on the California Coordinate System of 1983, Zone 5. Multiply distances shown by 1.000068345 to obtain ground level distances.

This real property description has been prepared by me, or under my direction, in conformance with the Professional Land Surveyors Act.

Signature: _____

Professional Land Surveyor

Date: _____

Nov. 25, 2008





DIST.	COUNTY	ROUTE	KILOMETER POST
08	Sbd.	215	13.00

EXHIBIT "B"
SHEET 1 OF 2

PARCEL No. 20627-1

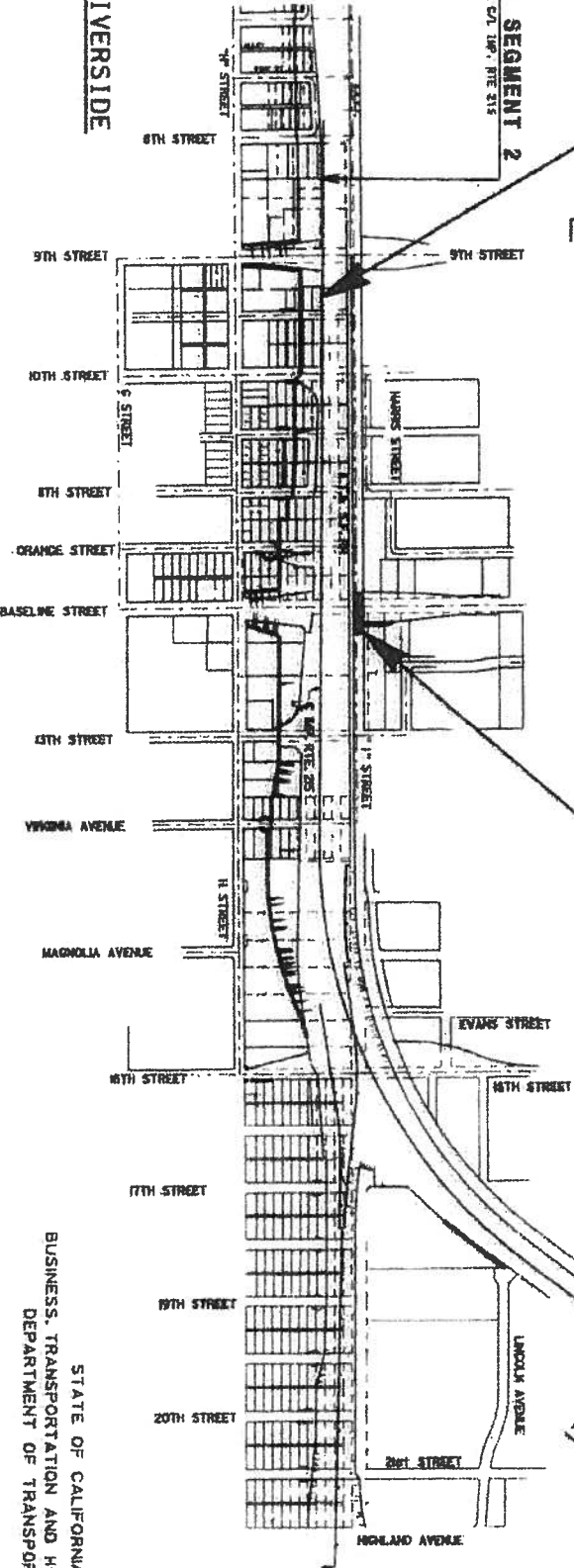
Q IMP. RTE. 215

BEGIN SEGMENT 2
125+00.00 C/L IMP. RTE 215

END SEGMENT 2
145+00.00 C/L IMP. RTE 215

TO VICTORVILLE

TO RIVERSIDE



CITY OF
SAN BERNARDINO
RANDO SAN BERNARDINO
M.B. 7 / 2

**PARCEL
INDEX MAP**

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

NO SCALE

Caltrans Metric

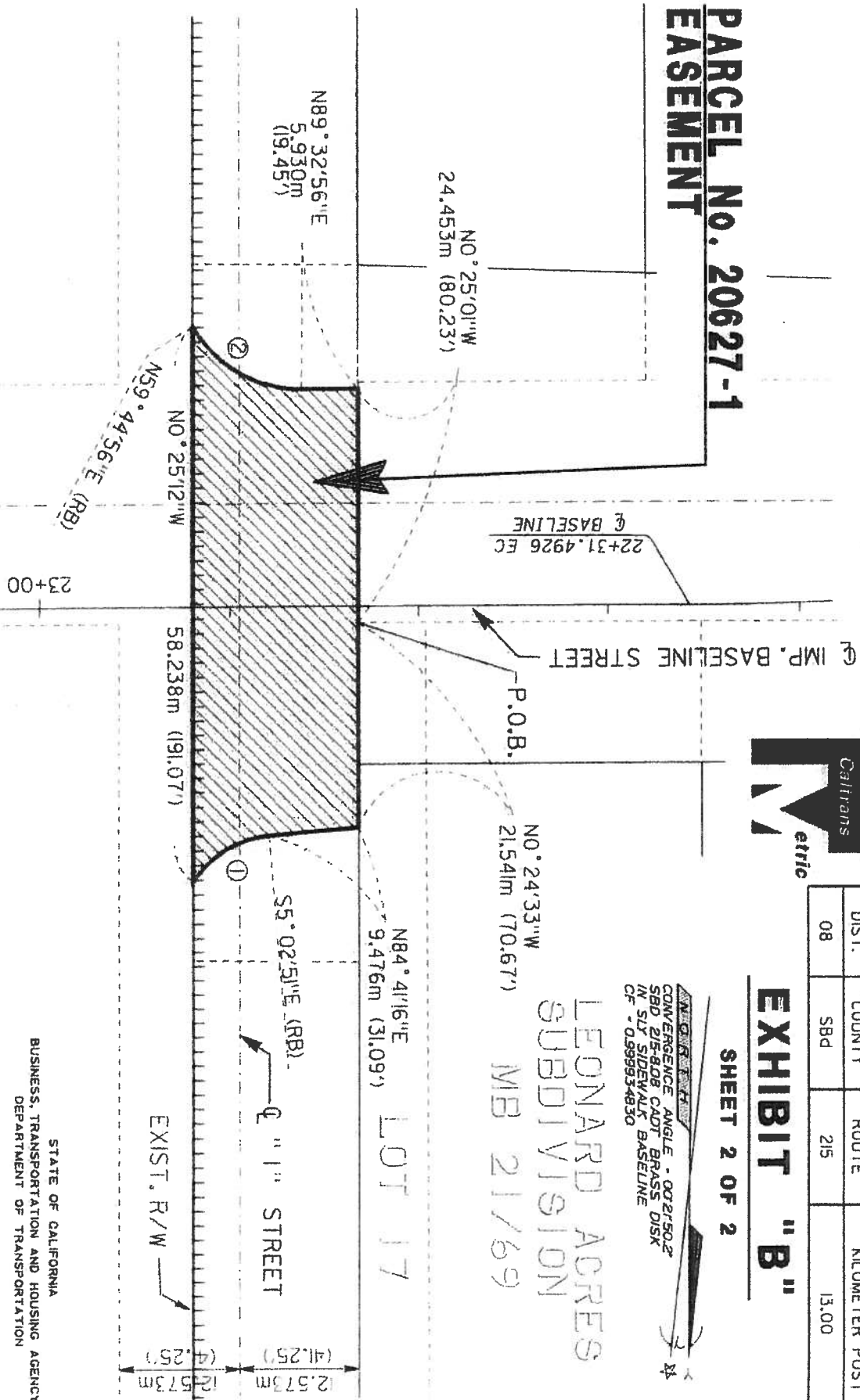
DIST.	COUNTY	ROUTE	KILOMETER POST
08	Sbd	215	13.00

EXHIBIT "B"

SHEET 2 OF 2

CONVERGENCE ANGLE - 002150.2°
SBD 215-808 CADT BRASS DISK
IN 5LY SIDEWALK BASELINE
CF - 0.999934830

LEONARD ACRES
SUBDIVISION
MEB 21/69



STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

PARCEL MAP

CURVE DATA			
NO.	Δ	RADIUS	LENGTH
①	52°14'07"	10.585m (34.73')	9.650m (31.66')
②	60°11'38"	13.280m (43.57')	13.952m (45.77')



EXHIBIT "C"
CONTRACTOR REQUIREMENTS
BASELINE STREET OVERHEAD

1.01 General

- **1.01.01** The Contractor must cooperate with **BNSF RAILWAY COMPANY**, hereinafter referred to as "Railway" where work is over or under on or adjacent to Railway property and/or right-of-way, hereafter referred to as "Railway Property", during the demolition and reconstruction of the Baseline Street Overhead.
- **1.01.02** The Contractor must execute and deliver to the Railway duplicate copies of the Exhibit "C-1" Agreement, in the form attached hereto, obligating the Contractor to provide and maintain in full force and effect the insurance called for under Section 3 of said Exhibit "C-1". Questions regarding procurement of the Railroad Protective Liability Insurance should be directed to Rosa Martinez at Marsh, USA, 214-303-8519.
- **1.01.03** The Contractor must plan, schedule and conduct all work activities so as not to interfere with the movement of any trains on Railway Property.

1.01.04 The Contractor's right to enter Railway's Property is subject to the absolute right of Railway to cause the Contractor's work on Railway's Property to cease if, in the opinion of Railway, Contractor's activities create a hazard to Railway's Property, employees, and/or operations. Railway will have the right to stop construction work on the Project if any of the following events take place: (i) Contractor (or any of its subcontractors) performs the Project work in a manner contrary to the plans and specifications approved by Railway; (ii) Contractor (or any of its subcontractors), in Railway's opinion, prosecutes the Project work in a manner which is hazardous to Railway property, facilities or the safe and expeditious movement of railroad traffic; (iii) the insurance described in the attached Exhibit C-1 is canceled during the course of the Project; or (iv) STATE OF CALIFORNIA fails to pay Railway for the Temporary Construction License or the Easement pursuant to Article II, Section 1 of this Agreement. The work stoppage will continue until all necessary actions are taken by Contractor or its subcontractor to rectify the situation to the satisfaction of Railway's Division Engineer or until additional insurance has been delivered to and accepted by Railway. In the event of a breach of (i) this Agreement, (ii) the Temporary Construction License, or (iii) the Easement, Railway may immediately terminate the Temporary Construction License or the Easement. Any such work stoppage under this provision will not give rise to any liability on the part of Railway. Railway's right to stop the work is in addition to any other rights Railway may have including, but not limited to, actions or suits for damages or lost profits. In the event that Railway desires to stop construction work on the Project, Railway agrees to immediately notify the following individual in writing:

SANBAG Director of Freeway Construction
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410
Fax: (909) 388-2002.

- **1.01.05** The Contractor is responsible for determining and complying with all Federal, State and Local Governmental laws and regulations, including, but not limited to environmental laws and regulations (including but not limited to the Resource Conservation and Recovery Act, as amended; the Clean Water Act, the Oil Pollution Act, the Hazardous Materials Transportation Act, CERCLA), and health and safety laws and regulations. The Contractor hereby indemnifies, defends and holds harmless Railway for, from and against all fines or penalties imposed or assessed by Federal, State and Local Governmental Agencies against the Railway which arise out of Contractor's work under this Agreement.

1.01.06 The Contractor must notify the Director of Freeway Construction, **SAN BERNARDINO ASSOCIATED GOVERNMENTS**, hereinafter referred to as ("**SANBAG**") at 1170 W. 3rd Street, 2nd Floor, San Bernardino, CA. 92410, Fax No. (909) 388 2002 and Railway's Manager Public Projects, telephone number (909)-386-4472, at least thirty (30) calendar days before commencing any work on Railway Property. Contractor's notification to Railway, must refer to Railroad's file No. 026112Y.

- **1.01.07** . For any bridge demolition and/or falsework above any tracks or any excavations located with any part of the excavations located within, whichever is greater, twenty-five (25) feet of the nearest track or intersecting a slope from the plane of the top of rail on a 2 horizontal to 1 vertical slope beginning at eleven (11) feet from centerline of the nearest track, both measured perpendicular to center line of track, the Contractor must furnish the Railway five sets of working drawings showing details of construction affecting Railway Property and tracks. The working drawing must include the proposed method of installation and removal of falsework, shoring or cribbing, not included in the contract plans and two sets of structural calculations of any falsework, shoring or cribbing. For all excavation and shoring submittal plans, the current "BNSF-UPRR Guidelines for Temporary Shoring" must be used for determining the design loading conditions to be used in shoring design, and all calculations and submittals must be in accordance with the current "BNSF-UPRR Guidelines for Temporary Shoring". All submittal drawings and calculations must be stamped by a registered professional engineer licensed to practice in the state the project is located. All calculations must take into consideration railway surcharge loading and must be designed to meet American Railway Engineering and Maintenance-of-Way Association (previously known as American Railway Engineering Association) Coopers E-80 live loading standard. All drawings and calculations must be stamped by a registered professional engineer licensed to practice in the state the project is located. The Contractor must not begin work until notified by the Railway that plans have been approved. The Contractor will be required to use lifting devices such as, cranes and/or winches to place or to remove any falsework over Railway's tracks. In no case will the Contractor be relieved of responsibility for results obtained by the implementation of said approved plans.
- **1.01.08** Subject to the movement of Railway's trains, Railway will cooperate with the Contractor such that the work may be handled and performed in an efficient manner. The Contractor will have no claim whatsoever for any type of damages or for extra or additional compensation in the event his work is delayed by the Railway.

1.02 Contractor Safety Orientation

- **1.02.01** No employee of the Contractor, its subcontractors, agents or invitees may enter Railway Property without first having completed Railway's Engineering Contractor Safety Orientation, found on the web site www.contractororientation.com. The Contractor must ensure that each of its employees, subcontractors, agents or invitees completes Railway's Engineering Contractor Safety Orientation through internet sessions before any work is performed on the Project. Additionally, the Contractor must ensure that each and every one of its employees, subcontractors, agents or invitees possesses a card certifying completion of the Railway Contractor Safety Orientation before entering Railway Property. The Contractor is responsible for the cost of the Railway Contractor Safety Orientation. The Contractor must renew the Railway Contractor Safety Orientation annually. Further clarification can be found on the web site or from the Railway's Representative.

1.03 Railway Requirements

- **1.03.01** The Contractor must take protective measures as are necessary to keep railway facilities, including track ballast, free of sand, debris, and other foreign objects and materials resulting from his operations. Any damage to railway facilities resulting from Contractor's operations will be repaired or replaced by Railway and the cost of such repairs or replacement must be paid for by SANBAG.
- **1.03.02** Blasting shall not be allowed on or adjacent to Railway property and/or right of way unless approved by the Railway.
- **1.03.03** The Contractor must abide by the following temporary clearances during construction:
 - 15' -0" Horizontally from centerline of nearest track
 - 21'-6" Vertically above top of rail
 - 27'-0" Vertically above top of rail for electric wires carrying less than 750 volts
 - 28'-0" Vertically above top of rail for electric wires carrying 750 volts to 15,000 volts
 - 30'-0" Vertically above top of rail for electric wires carrying 15,000 volts to 20,000 volts
 - 34'-0" Vertically above top of rail for electric wires carrying more than 20,000 volts

- **1.03.04** Upon completion of construction, the following clearances shall be maintained:
 - 49'-6" Horizontally from centerline of nearest track
 - 25'-7" Vertically above top of rail
- **1.03.05** Any infringement within State statutory clearances due to the Contractor's operations must be submitted to the Railway and to SANBAG and must not be undertaken until approved in writing by the Railway, and until SANBAG has obtained any necessary authorization from the State Regulatory Authority for the infringement. No extra compensation will be allowed in the event the Contractor's work is delayed pending Railway approval, and/or the State Regulatory Authority's approval.
- **1.03.06** In the case of impaired vertical clearance above top of rail, Railway will have the option of installing tell-tales or other protective devices Railway deems necessary for protection of Railway operations. The cost of tell-tales or protective devices will be borne by SANBAG.
- **1.03.07** The details of construction affecting the Railway's Property and tracks not included in the contract plans must be submitted to the Railway by SANBAG for approval before work is undertaken and this work must not be undertaken until approved by the Railway.
- **1.03.08** At other than public road crossings, the Contractor must not move any equipment or materials across Railway's tracks until permission has been obtained from the Railway. The Contractor must obtain a "Temporary Construction Crossing Agreement" from the Railway prior to moving his equipment or materials across the Railways tracks. The temporary crossing must be gated and locked at all times when not required for use by the Contractor. The temporary crossing for use of the Contractor will be constructed and at the completion of the project, removed at the expense of the Contractor.
- **1.03.09** Discharge, release or spill on the Railway Property of any hazardous substances, oil, petroleum, constituents, pollutants, contaminants, or any hazardous waste is prohibited and Contractor must immediately notify the Railway's Resource Operations Center at 1(800) 832-5452, of any discharge, release or spills in excess of a reportable quantity. Contractor must not allow Railway Property to become a treatment, storage or transfer facility as those terms are defined in the Resource Conservation and Recovery Act or any state analogue.
- **1.03.10** The Contractor upon completion of the work covered by this contract, must promptly remove from the Railway's Property all of Contractor's tools, equipment, implements and other materials, whether brought upon said property by said Contractor or any Subcontractor, employee or agent of Contractor or of any Subcontractor, and must cause Railway's Property to be left in a condition acceptable to the Railway's representative.

1.04 Contractor Roadway Worker on Track Safety Program and Safety Action Plan

- **1.04.01** Each Contractor that will perform work within 25 feet of the centerline of a track must develop and implement a Roadway Worker Protection/On Track Safety Program and work with Railway Project Representative to develop an on track safety strategy as described in the guidelines listed in the on track safety portion of the Safety Orientation. This Program must provide Roadway Worker protection/on track training for all employees of the Contractor, its subcontractors, agents or invitees. This training is reinforced at the job site through job safety briefings. Additionally, each Contractor must develop and implement the Safety Action Plan, as provided for on the web site www.contractororientation.com, which will be made available to Railway prior to commencement of any work on Railway Property. During the performance of work, the Contractor must audit its work activities. The Contractor must designate an on-site Project Supervisor who will serve as the contact person for the Railway and who will maintain a copy of the Safety Action Plan, safety audits, and Material Safety Datasheets (MSDS), at the job site.
- **1.04.02** Contractor shall have a background investigation performed on all of its employees, subcontractors and agents who will be performing any services on railroad property under this Agreement.

The background screening shall at a minimum meet the criteria defined by the e-RAILSAFE program outlined

at <http://www.e-railsafe.com> in addition to any other applicable regulatory requirements. The e-RAILSAFE program uses rail industry background screening standards.

Contractor shall obtain consent from all employees screened in compliance with the e-RAILSAFE program criteria to release completed background information to BNSF. Contractor shall be subject to periodic audit to ensure compliance.

Contractor shall not permit any of its employees, subcontractors or agents to perform services on property hereunder who are not approved under e-RAILSAFE program standards. Railroad shall have the right to deny entry onto its premises to any of Contractor's employees, subcontractors or agents who do not display the authorized identification badge issued by a background screening service meeting the standards set forth for the e-RAILSAFE program or who pose a threat, in Railroad's reasonable opinion, to the safety or security of Railroad's operations.

Contractors shall ensure its employees, subcontractors and agents are United States citizens or legally working in this country under a work VISA.

1.05 Facilities and Railway Flagger Services:

- **1.05.01** The Contractor must give Railway's Roadmaster (telephone 909 386 4061) a minimum of thirty (30) calendar days advance notice when flagging services will be required so that the Roadmaster can make appropriate arrangements (i.e., bulletin the flagger's position). If flagging services are scheduled in advance by the Contractor and it is subsequently determined by the parties hereto that such services are no longer necessary, the Contractor must give the Roadmaster five (5) working days advance notice so that appropriate arrangements can be made to abolish the position pursuant to union requirements.
- **1.05.02** Unless determined otherwise by Railway's Project Representative, Railway flagger will be required and furnished when Contractor's work activities are located over, under and/or within twenty-five (25) feet measured horizontally from centerline of the nearest track and when cranes or similar equipment positioned beyond 25-feet from the track centerline could foul the track in the event of tip over or other catastrophic occurrence, but not limited thereto for the following conditions:

1.05.02a When upon inspection by Railway's Representative, other conditions warrant.

- **1.05.02b** When any excavation is performed below the bottom of tie elevation, if, in the opinion of Railway's representative, track or other Railway facilities may be subject to movement or settlement.
- **1.05.02c** When work in any way interferes with the safe operation of trains at timetable speeds.
- **1.05.02d** When any hazard is presented to Railway track, communications, signal, electrical, or other facilities either due to persons, material, equipment or blasting in the vicinity.
- **1.05.02e** Special permission must be obtained from the Railway before moving heavy or cumbersome objects or equipment which might result in making the track impassable.
- **1.05.03** Flagging services will be performed by qualified Railway flaggers.
- **1.05.03a** Flagging crew generally consists of one employee. However, additional personnel may be required to protect Railway Property and operations, if deemed necessary by the Railways Representative.
- **1.05.03b** Each time a flagger is called, the minimum period for billing will be the eight (8) hour basic day.
- **1.05.03c** The cost of flagger services provided by the Railway will be borne by SANBAG. The estimated cost for one (1) flagger is approximately between \$800.00 - \$1600.00 for an eight (8) hour basic day with time and one-half or double time for overtime, rest days and holidays. The estimated cost for each flagger includes vacation allowance, paid holidays, Railway and unemployment insurance, public liability and property damage insurance, health and welfare benefits, vehicle transportation, meals, lodging, radio equipment, supervision and other costs incidental to performing flagging services. Negotiations for Railway labor or collective bargaining

agreements and rate changes authorized by appropriate Federal authorities may increase actual or estimated flagging rates. The flagging rate in effect at the time of performance by the Contractor hereunder will be used to calculate the actual costs of flagging pursuant to this paragraph.

- **1.05.03d** . The average train traffic on this route is 79 freight trains and 2 passenger trains per 24-hour period. Train timetable speeds are:

Westward: 50 MPH Passenger, 35 MPH Freight

Eastward: 60 MPH Passenger, 55 MPH Freight

1.06 Contractor General Safety Requirements

- **1.06.01** Work in the proximity of railway track(s) is potentially hazardous where movement of trains and equipment can occur at any time and in any direction. All work performed by contractors within 25 feet of any track must be in compliance with FRA Roadway Worker Protection Regulations.
- **1.06.02** Before beginning any task on Railway Property, a thorough job safety briefing must be conducted with all personnel involved with the task and repeated when the personnel or task changes. If the task is within 25 feet of any track, the job briefing must include the Railway's flagger, as applicable, and include the procedures the Contractor will use to protect its employees, subcontractors, agents or invitees from moving any equipment adjacent to or across any Railway track(s).
- **1.06.03** Workers must not work within 25 feet of the centerline of any track without an on track safety strategy approved by the Railway's Project Representative. When authority is provided, every contractor employee must know: (1) who the Railway flagger is, and how to contact the flagger, (2) limits of the authority, (3) the method of communication to stop and resume work, and (4) location of the designated places of safety. Persons or equipment entering flag/work limits that were not previously job briefed, must notify the flagger immediately, and be given a job briefing when working within 25 feet of the center line of track.
- **1.06.04** When Contractor employees are required to work on the Railway Property after normal working hours or on weekends, the Railroad's representative in charge of the project must be notified. A minimum of two employees must be present at all times.
- **1.06.05** Any employees, agents or invitees of Contractor or its subcontractors under suspicion of being under the influence of drugs or alcohol, or in the possession of same, will be removed from the Railway's Property and subsequently released to the custody of a representative of Contractor management. Future access to the Railway's Property by that employee will be denied.
- **1.06.06** Any damage to Railway Property, or any hazard noticed on passing trains must be reported immediately to the Railway's representative in charge of the project. Any vehicle or machine which may come in contact with track, signal equipment, or structure (bridge) and could result in a train derailment must be reported immediately to the Railway representative in charge of the project and to the Railway's Resource Operations Center at 1(800) 832-5452. Local emergency numbers are to be obtained from the Railway representative in charge of the project prior to the start of any work and must be posted at the job site.
- **1.06.07** For safety reasons, all persons are prohibited from having pocket knives, firearms or other deadly weapons in their possession while working on Railway's Property.
- **1.06.08** All personnel protective equipment (PPE) used on Railway Property must meet applicable OSHA and ANSI specifications. Current Railway personnel protective equipment requirements are listed on the web site, www.contractororientation.com, however, a partial list of the requirements include: a) safety glasses with permanently affixed side shields (no yellow lenses); b) hard hats c) safety shoe with: hardened toes, above-the-ankle lace-up and a defined heel; and d) high visibility retro-reflective work wear. The Railroad's representative in charge of the project is to be contacted regarding local specifications for meeting requirements relating to hi-visibility work wear. Hearing protection, fall protection, gloves, and respirators must be worn as required by State and Federal regulations. **(NOTE – Should there be a discrepancy between the information**

contained on the web site and the information in this paragraph, the web site will govern.)

- **1.06.09 THE CONTRACTOR MUST NOT PILE OR STORE ANY MATERIALS, MACHINERY OR EQUIPMENT CLOSER THAN 25'-0" TO THE CENTER LINE OF THE NEAREST RAILWAY TRACK. MATERIALS, MACHINERY OR EQUIPMENT MUST NOT BE STORED OR LEFT WITHIN 250 FEET OF ANY HIGHWAY/RAIL AT-GRADE CROSSINGS OR TEMPORARY CONSTRUCTION CROSSING, WHERE STORAGE OF THE SAME WILL OBSTRUCT THE VIEW OF A TRAIN APPROACHING THE CROSSING. PRIOR TO BEGINNING WORK, THE CONTRACTOR MUST ESTABLISH A STORAGE AREA WITH CONCURRENCE OF THE RAILROAD'S REPRESENTATIVE.**
- **1.06.10** Machines or vehicles must not be left unattended with the engine running. Parked machines or equipment must be in gear with brakes set and if equipped with blade, pan or bucket, they must be lowered to the ground. All machinery and equipment left unattended on Railway's Property must be left inoperable and secured against movement. (See internet Engineering Contractor Safety Orientation program for more detailed specifications)
- **1.06.11** Workers must not create and leave any conditions at the work site that would interfere with water drainage. Any work performed over water must meet all Federal, State and Local regulations.
- **1.06.12** All power line wires must be considered dangerous and of high voltage unless informed to the contrary by proper authority. For all power lines the minimum clearance between the lines and any part of the equipment or load must be; 200 KV or below - 15 feet; 200 to 350 KV - 20 feet; 350 to 500 KV - 25 feet; 500 to 750 KV - 35 feet; and 750 to 1000 KV - 45 feet. If capacity of the line is not known, a minimum clearance of 45 feet must be maintained. A person must be designated to observe clearance of the equipment and give a timely warning for all operations where it is difficult for an operator to maintain the desired clearance by visual means.

1.07 Excavation

- **1.07.01** Before excavating, the Contractor must determine whether any underground pipe lines, electric wires, or cables, including fiber optic cable systems are present and located within the Project work area. The Contractor must determine whether excavation on Railway's Property could cause damage to buried cables resulting in delay to Railway traffic and disruption of service to users. Delays and disruptions to service may cause business interruptions involving loss of revenue and profits. Before commencing excavation, the Contractor must contact **BNSF's Field Engineering Representative (909 386 4079)**. All underground and overhead wires will be considered HIGH VOLTAGE and dangerous until verified with the company having ownership of the line. **It is the Contractor's responsibility to notify any other companies that have underground utilities in the area and arrange for the location of all underground utilities before excavating.**
- **1.07.02** The Contractor must cease all work and notify the Railway immediately before continuing excavation in the area if obstructions are encountered which do not appear on drawings. If the obstruction is a utility and the owner of the utility can be identified, then the Contractor must also notify the owner immediately. If there is any doubt about the location of underground cables or lines of any kind, no work must be performed until the exact location has been determined. There will be no exceptions to these instructions.
- **1.07.03** All excavations must be conducted in compliance with applicable OSHA regulations and, regardless of depth, must be shored where there is any danger to tracks, structures or personnel.
- **1.07.04** Any excavations, holes or trenches on the Railway's Property must be covered, guarded and/or protected when not being worked on. When leaving work site areas at night and over weekends, the areas must be secured and left in a condition that will ensure that Railway employees and other personnel who may be working or passing through the area are protected from all hazards. All excavations must be back filled as soon as possible.

1.08 Hazardous Waste, Substances and Material Reporting

- **1.08.01** If Contractor discovers any hazardous waste, hazardous substance, petroleum or other deleterious material, including but not limited to any non-containerized commodity or material, on or adjacent to Railway's Property, in or near any surface water, swamp, wetlands or waterways, while performing any work under this Agreement, Contractor must immediately: (a) notify the Railway's Resource Operations Center at 1(800) 832-5452, of such discovery: (b) take safeguards necessary to protect its employees, subcontractors, agents and/or third parties: and (c) exercise due care with respect to the release, including the taking of any appropriate measure to minimize the impact of such release.

1.09 Personal Injury Reporting

- **1.09.01** The Railway is required to report certain injuries as a part of compliance with Federal Railroad Administration (FRA) reporting requirements. Any personal injury sustained by an employee of the Contractor, subcontractor or Contractor's invitees while on the Railway's Property must be reported immediately (by phone mail if unable to contact in person) to the Railway's representative in charge of the project. The Non-Employee Personal Injury Data Collection Form contained herein is to be completed and sent by Fax to the Railway at 1(817) 352-7595 and to the Railway's Project Representative no later than the close of shift on the date of the injury.

NON-EMPLOYEE PERSONAL INJURY DATA COLLECTION

INFORMATION REQUIRED TO BE COLLECTED PURSUANT TO FEDERAL REGULATION. IT SHOULD BE USED FOR COMPLIANCE WITH FEDERAL REGULATIONS ONLY AND IS NOT INTENDED TO PRESUME ACCEPTANCE OF RESPONSIBILITY OR LIABILITY.

1. Accident City/St _____ 2. Date: _____ Time: _____
County: _____ 3. Temperature: _____ 4. Weather _____
(if non-Railway location)
5. Social Security # _____
6. Name (last, first, mi) _____
7. Address: Street: _____ City: _____ St. _____ Zip: _____
8. Date of Birth: _____ and/or Age _____ Gender: _____
(if available)
9. (a) Injury: _____ (b) Body Part: _____
(i.e. (a) Laceration (b) Hand)
11. Description of Accident (To include location, action, result, etc.): _____
12. Treatment:
 ? First Aid Only
 ? Required Medical Treatment
 ? Other Medical Treatment
13. Dr. Name _____ 30. Date: _____
14. Dr. Address:
 Street: _____ City: _____ St: _____ Zip: _____
15. Hospital Name: _____
16. Hospital Address:
 Street: _____ City: _____ St: _____ Zip: _____
17. Diagnosis: _____

**FAX TO
RAILWAY AT (817) 352-7595
AND COPY TO
RAILWAY ROADMASTER FAX 909-386-4843**

OVERHEAD EXHIBIT "C-1"

**Agreement
Between
BNSF RAILWAY COMPANY
and the
CONTRACTOR**

**BNSF RAILWAY COMPANY
Attention: Manager Public Projects**

**Railway File: 026112Y
Agency Project: Baseline St. Overhead**

Gentlemen:

The undersigned (hereinafter called, the "Contractor"), has entered into a contract (the "Contract") dated _____, 200_, with **SAN BERNARDINO ASSOCIATED GOVERNMENTS** for the performance of certain work in connection with the following project: demolish and reconstruct the Baseline Street Overhead, in San Bernardino, CA. Performance of such work will necessarily require contractor to enter BNSF RAILWAY COMPANY ("Railway") right of way and property ("Railway Property"). The Contract provides that no work will be commenced within Railway Property until the Contractor employed in connection with said work for **SAN BERNARDINO ASSOCIATED GOVERNMENTS** (i) executes and delivers to Railway an Agreement in the form hereof, and (ii) provides insurance of the coverage and limits specified in such Agreement and Section 3 herein. If this Agreement is executed by a party who is not the Owner, General Partner, President or Vice President of Contractor, Contractor must furnish evidence to Railway certifying that the signatory is empowered to execute this Agreement on behalf of Contractor.

Accordingly, in consideration of Railway granting permission to Contractor to enter upon Railway Property and as an inducement for such entry, Contractor, effective on the date of the Contract, has agreed and does hereby agree with Railway as follows:

Section 1. RELEASE OF LIABILITY AND INDEMNITY

Contractor hereby waives, releases, indemnifies, defends and holds harmless Railway for all judgments, awards, claims, demands, and expenses (including attorneys' fees), for injury or death to all persons, including Railway's and Contractor's officers and employees, and for loss and damage to property belonging to any person, arising in any manner from Contractor's or any of Contractor's subcontractors' acts or omissions or any work performed on or about Railway's property or right-of-way. **THE LIABILITY ASSUMED BY CONTRACTOR WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DESTRUCTION, DAMAGE, DEATH, OR INJURY WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF RAILWAY, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, UNLESS SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE WILLFUL MISCONDUCT OR SOLE NEGLIGENCE OF RAILWAY.**

THE INDEMNIFICATION OBLIGATION ASSUMED BY CONTRACTOR INCLUDES ANY CLAIMS, SUITS OR JUDGMENTS BROUGHT AGAINST RAILWAY UNDER THE FEDERAL EMPLOYEE'S LIABILITY ACT, INCLUDING CLAIMS FOR STRICT LIABILITY UNDER THE SAFETY APPLIANCE ACT OR THE LOCOMOTIVE INSPECTION ACT, WHENEVER SO CLAIMED.

Contractor further agrees, at its expense, in the name and on behalf of Railway, that it will adjust and settle all claims made against Railway, and will, at Railway's discretion, appear and defend any suits or actions of law or in equity brought against Railway on any claim or cause of action arising or growing out of or in any manner connected with any liability assumed by Contractor under this Agreement for which Railway is liable or is alleged to be liable. Railway will give notice to Contractor, in writing, of the receipt or dependency of such claims and thereupon Contractor must proceed to adjust and handle to a conclusion such claims, and in the event of a suit being brought against Railway, Railway may forward summons and complaint or other process in connection therewith to Contractor, and Contractor, at Railway's discretion, must defend, adjust, or settle such suits and protect, indemnify, and save harmless Railway from and against all damages, judgments, decrees, attorney's fees, costs, and expenses growing out of or resulting from or incident to any such claims or suits.

In addition to any other provision of this Agreement, in the event that all or any portion of this Article shall be deemed to be inapplicable for any reason, including without limitation as a result of a decision of an applicable court, legislative enactment or regulatory order, the parties agree that this Article shall be interpreted as requiring Contractor to indemnify Railroad to the fullest extent permitted by applicable law. **THROUGH THIS AGREEMENT THE PARTIES EXPRESSLY INTEND FOR CONTRACTOR TO INDEMNIFY RAILROAD FOR RAILROAD'S ACTS OF NEGLIGENCE.**

It is mutually understood and agreed that the assumption of liabilities and indemnification provided for in this Agreement survive any termination of this Agreement.

Section 2. TERM

This Agreement is effective from the date of the Contract until (i) the completion of the project set forth herein, and (ii) full and complete payment to Railway of any and all sums or other amounts owing and due hereunder.

Section 3. INSURANCE

Contractor must, at its sole cost and expense, procure and maintain during the life of this Agreement the following insurance coverage:

A. Commercial General Liability insurance. This insurance must contain broad form contractual liability with a combined single limit of a minimum of \$5,000,000 each occurrence and an aggregate limit of at least \$10,000,000. Coverage must be purchased on a post 1998 ISO occurrence form or equivalent and include coverage for, but not limit to the following:

- ◆ Bodily Injury and Property Damage
- ◆ Personal Injury and Advertising Injury
- ◆ Fire legal liability
- ◆ Products and completed operations

This policy must also contain the following endorsements, which must be indicated on the certificate of insurance:

- ◆ It is agreed that any workers' compensation exclusion does not apply to **Railroad** payments related to the Federal Employers Liability Act or a **Railroad** Wage Continuation Program or similar programs and any payments made are deemed not to be either payments made or obligations assumed under any Workers Compensation, disability benefits, or unemployment compensation law or similar law.
- ◆ The definition of insured contract must be amended to remove any exclusion or other limitation for any work being done within 50 feet of railroad property.
- ◆ Any exclusions related to the explosion, collapse and underground hazards must be removed.

No other endorsements limiting coverage as respects obligations under this Agreement may be included on the policy.

B. Business Automobile Insurance. This insurance must contain a combined single limit of at least \$1,000,000 per occurrence, and include coverage for, but not limited to the following:

- ◆ Bodily injury and property damage
- ◆ Any and all vehicles owned, used or hired

C. Workers Compensation and Employers Liability insurance including coverage for, but not limited to:

- ◆ California's statutory liability under the worker's compensation laws of the state(s) in which the work is to be performed. If optional under State law, the insurance must cover all employees anyway.
- ◆ Employers' Liability (Part B) with limits of at least \$500,000 each accident, \$500,000 by disease policy limit, \$500,000 by disease each employee.

D. Railroad Protective Liability insurance naming only the **Railroad** as the Insured with coverage of at least \$5,000,000 per occurrence and \$10,000,000 in the aggregate. The policy Must be issued on a standard ISO form CG 00 35 10 93 and include the following:

- ◆ Endorsed to include the Pollution Exclusion Amendment (ISO form CG 28 31 10 93)
- ◆ Endorsed to include the Limited Seepage and Pollution Endorsement.
- ◆ Endorsed to remove any exclusion for punitive damages.
- ◆ No other endorsements restricting coverage may be added.
- ◆ The original policy must be provided to the **Railroad** prior to performing any work or services under this Agreement

Other Requirements:

All policies (applying to coverage listed above) must not contain an exclusion for punitive damages and certificates of insurance must reflect that no exclusion exists.

Contractor agrees to waive its right of recovery against **Railroad** for all claims and suits against **Railroad**. In addition, its insurers, through the terms of the policy or policy endorsement, waive their right of subrogation against **Railroad** for all claims and suits. The certificate of insurance must reflect the waiver of subrogation endorsement. Contractor further waives its right of recovery, and its insurers also waive their right of subrogation against **Railroad** for loss of its owned or leased property or property under contractor's care, custody or control.

Contractor's insurance policies through policy endorsement, must include wording which states that the policy is primary and non-contributing with respect to any insurance carried by **Railroad**. The certificate of insurance must reflect that the above wording is included in evidenced policies.

All policy(ies) required above (excluding Workers Compensation and if applicable, Railroad Protective) must include a severability of interest endorsement and **Railroad** must be named as an additional insured with respect to work performed under this agreement. Severability of interest and naming **Railroad** as additional insured must be indicated on the certificate of insurance.

Contractor is not allowed to self-insure without the prior written consent of **Railroad**. If granted by **Railroad**, any deductible, self-insured retention or other financial responsibility for claims must be covered directly by contractor in lieu of insurance. Any and all **Railroad** liabilities that would otherwise, in accordance with the provisions of this **Agreement**, be covered by contractor's insurance will be covered as if contractor elected not to include a deductible, self-insured retention or other financial responsibility for claims.

Prior to commencing the Work, contractor must furnish to **Railroad** an acceptable certificate(s) of insurance including an original signature of the authorized representative evidencing the required coverage, endorsements, and amendments and referencing the contract audit/folder number if available. The policy(ies) must contain a provision that obligates the insurance company(ies) issuing such policy(ies) to notify **Railroad** in writing at least 30 days prior to any cancellation, non-renewal, substitution or material alteration. This cancellation

provision must be indicated on the certificate of insurance. Upon request from **Railroad**, a certified duplicate original of any required policy must be furnished. Contractor should send the certificate(s) to the following address:

EBIX BPO
PO Box 12010-BN
Hemet, CA 92546-8010
Fax number: 951-766-2299
Email: customerservice@certsonline.com

Any insurance policy must be written by a reputable insurance company acceptable to **Railroad** or with a current Best's Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the service is to be provide.

Contractor represents that this **Agreement** has been thoroughly reviewed by contractor's insurance agent(s)/broker(s), who have been instructed by contractor to procure the insurance coverage required by this **Agreement**. Allocated Loss Expense must be in addition to all policy limits for coverages referenced above.

Not more frequently than once every five years, **Railroad** may reasonably modify the required insurance coverage to reflect then-current risk management practices in the railroad industry and underwriting practices in the insurance industry.

If any portion of the operation is to be subcontracted by contractor, contractor must require that the subcontractor provide and maintain the insurance coverages set forth herein, naming **Railroad** as an additional insured, and requiring that the subcontractor release, defend and indemnify **Railroad** to the same extent and under the same terms and conditions as contractor is required to release, defend and indemnify **Railroad** herein.

Failure to provide evidence as required by this section will entitle, but not require, **Railroad** to terminate this **Agreement** immediately. Acceptance of a certificate that does not comply with this section will not operate as a waiver of contractor's obligations hereunder.

The fact that insurance (including, without limitation, self-insurance) is obtained by contractor will not be deemed to release or diminish the liability of contractor including, without limitation, liability under the indemnity provisions of this **Agreement**. Damages recoverable by **Railroad** will not be limited by the amount of the required insurance coverage.

For purposes of this section, **Railroad** means "Burlington Northern Santa Fe Corporation", "BNSF RAILWAY COMPANY" and the subsidiaries, successors, assigns and affiliates of each.

Section 4. EXHIBIT "C" CONTRACTOR REQUIREMENTS

The Contractor must observe and comply with the provisions, obligations, requirements and limitations contained in the Contract and the Contractor Requirements set forth on Exhibit "C" attached to the Contract and this Agreement, including, but not be limited to, payment of all costs incurred for any damages to Railway roadbed, tracks, and/or appurtenances thereto, resulting from use, occupancy, or presence of its employees, representatives, or agents or subcontractors on or about the construction site.

Section 5. TRAIN DELAY

Contractor is responsible for and hereby indemnifies and holds harmless Railway (including its affiliated railway companies, and its tenants) for, from and against all damages arising from any unscheduled delay to a freight or passenger train which affects Railway's ability to fully utilize its equipment and to meet customer service and contract obligations. Contractor will be billed, as further provided below, for the economic losses arising from loss of use of equipment, contractual loss of incentive pay and bonuses and contractual penalties resulting from train delays, whether caused by Contractor, or subcontractors, or by the Railway performing work under this Agreement. Railway agrees that it will not perform any act to unnecessarily cause train delay.

For loss of use of equipment, Contractor will be billed the current freight train hour rate per train as determined from Railway's records. Any disruption to train traffic may cause delays to multiple trains at the same time for the same period.

Additionally, the parties acknowledge that passenger, U.S. mail trains and certain other grain, intermodal, coal and freight trains operate under incentive/penalty contracts between Railway and its customer(s). Under these arrangements, if Railway does not meet its contract service commitments, Railway may suffer loss of performance or incentive pay and/or be subject to penalty payments. Contractor is responsible for any train performance and incentive penalties or other contractual economic losses actually incurred by Railway which are attributable to a train delay caused by Contractor or its subcontractors.

The contractual relationship between Railway and its customers is proprietary and confidential. In the event of a train delay covered by this Agreement, Railway will share information relevant to any train delay to the extent consistent with Railway confidentiality obligations. Damages for train delay for certain trains may be \$382.20 per hour per incident. **THE RATE THEN IN EFFECT AT THE TIME OF PERFORMANCE BY THE CONTRACTOR HEREUNDER WILL BE USED TO CALCULATE THE ACTUAL COSTS OF TRAIN DELAY PURSUANT TO THIS AGREEMENT.**

Contractor and its subcontractors must give Railway's representative 909 386 4079 eight (8) weeks advance notice of the times and dates for proposed work windows. Railway and Contractor will establish mutually agreeable work windows for the project. Railway has the right at any time to revise or change the work windows due to train operations or service obligations. Railway will not be responsible for any additional costs or expenses resulting from a change in work windows. Additional costs or expenses resulting from a change in work windows shall be accounted for in Contractor's expenses for the project.

Contractor and subcontractors must plan, schedule, coordinate and conduct all Contractor's work so as to not cause any delays to any trains.

Kindly acknowledge receipt of this letter by signing and returning to the Railway two original copies of this letter, which, upon execution by Railway, will constitute an Agreement between us.

(Contractor)

BNSF Railway Company

By: _____
Printed Name: _____
Title: _____

By: _____
Name: **Melvin Thomas**
Manager Public Projects

Contact Person: _____
Address _____

Accepted and effective this ____ day of 20__.

City: _____ State: _____ Zip: _____
Fax: _____
Phone: _____
E-mail: _____

EXHIBIT D

***** MAINTAIN PROPRIETARY CONFIDENTIALITY *****

BNSF RAILWAY COMPANY COMPANY ESTIMATE FOR SANBAG

LOCATION ONO TO BASELINE DETAILS OF ESTIMATE PLAN ITEM : 000137253 VERSION : 1

PURPOSE, JUSTIFICATION AND DESCRIPTION

BNSF TO PROVIDE FLAGGING AND INSPECTION TO WIDEN BASELINE AVE BRIDGE/215 FREEWAY
100% BILLABLE TO SANBAG
RDM JIMMY CAPPS DE ADAM RICHARDSON

MAINTAIN PROPRIETARY CONFIDENTIALITY

THE PHYSICAL LIMITS OF THIS PROJECT ARE DESCRIBED BY LINE SEGMENT, MILE POST RANGES, AND IN SOME CASES TRACK NUMBER. THIS IS THE PRIMARY AREA FOR THE PROJECT. THERE WILL BE CASES WHERE WORK MAY OCCUR BEYOND THE DEFINED LIMITS.

PROJECTS THAT INCLUDE SIGNAL, ELECTRICAL, OR TELECOMMUNICATION EQUIPMENT MAY REQUIRE ACTIVITY BEYOND THESE DEFINED TRACK LIMITS. ALL OR PORTIONS OF SOME PROJECTS MAY OCCUR IN AREAS WHERE NO MILEPOST SIGNS EXIST SUCH AS YARDS.

THIS ESTIMATE IS GOOD FOR 90 DAYS. THEREAFTER THE ESTIMATE IS SUBJECT TO CHANGE IN COST FOR LABOR, MATERIAL, AND OVERHEAD.

DESCRIPTION	QUANTITY U/M	COST	TOTAL \$

LABOR			

FLAGGING - OTHER R.O.W.- CAP	8100.0 MH	195,237	
PAYROLL ASSOCIATED COSTS		85,904	
DA OVERHEADS		400,235	
TOTAL LABOR COST		681,376	681,376

MATERIAL			

TOTAL MATERIAL COST		0	0

OTHER			

CONTRACT PREPARATION	1.0 LS	10,000	
INSPECTION / COORDINATION	135.0 DAY	81,000	
TOTAL OTHER ITEMS COST		91,000	91,000
PROJECT SUBTOTAL			772,376
CONTINGENCIES			15,447
BILL PREPARATION FEE			0
GROSS PROJECT COST			787,823
LESS COST PAID BY BNSF			0
TOTAL BILLABLE COST			787,823

Exhibit E



Melvin Thomas	BNSF Railway Company
<i>Manager Public Projects</i>	740 East Carnegie Drive
<i>Engineering Services</i>	San Bernardino, CA 92408
	Office: 909-386-4472
	Fax: 909-386-4479
	Cell: 909-831-8199
	Email: melvin.thomas@bnsf.com

Date:

Garry Cohoe
Director of Freeway Construction
San Bernardino Associated Governments
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410

Re: Final Approval of Plans and Specifications dated _____ by
(consultant) (**hereinafter called, the "Plans and Specifications"**)

Dear Mr. Cohoe:

This letter serves as BNSF RAILWAY COMPANY'S ("BNSF") final written approval of that portion of the Plans and Specifications covering the Project's concept for reconstruction of the Baseline Street Overhead, U.S. D.O.T. No. 026112Y involving the vertical and horizontal clearances from the bridge soffit and the face of the columns, piers, and/or abutments which ever be the case and the location of the piers and abutments that will be constructed adjacent or on BNSF's Rail Corridor. This final written approval is given to SAN BERNARDINO ASSOCIATED GOVERNMENTS ("SANBAG") pursuant to Article III, Section 1 of that certain Overhead Agreement between BNSF, SANBAG, and the STATE of CALIFORNIA, which this Exhibit E is attached to and made a part thereof.

If the Plans and Specifications are revised by SANBAG subsequent to the date set forth above, this letter shall no longer serve as final written approval of the Plans and Specifications and SANBAG must resubmit said Plans and Specifications to BNSF for final written approval.

It is understood that the approvals contained in this letter do not cover, the approvals of plans and specifications for any falsework, shoring, and demolition that may be subsequently submitted to BNSF by SANBAG or its contractor for approval.

Respectfully,

Melvin Thomas

Manager Public Projects
BNSF Railway

Exhibit F

BNSF Bridge Requirements

BRIDGE DESIGN, PLANS & SPECIFICATIONS:

Except for the design of temporary falsework and shoring, BNSF review of the Structure plans will be limited to the vertical and horizontal clearances, sight distance for existing train signals, foundation dimensions and drainage characteristics as they relate to existing and future tracks. BNSF will not review structural design calculations for the permanent Structure unless a member or members are influenced by railroad live loads.

Temporary falsework and shoring plans and calculations must be reviewed and approved by BNSF prior to beginning construction. SANBAG shall perform an independent review of the design calculations for temporary falsework and shoring prior to submitting them to BNSF for approval. Temporary construction clearances must be no less than 15 feet measured horizontally from the centerline of the nearest track and 21 feet-6inches measured vertically from the top of rail of the most elevated track to the bottom of lowest temporary falsework member. State regulatory agencies may have more restrictive requirements for temporary railroad clearances.

For the permanent Structure, SANBAG will submit plans showing the least horizontal distance from the centerline of existing and future tracks to the face of the nearest member of the proposed Structure. The location of the least horizontal distance must be accurately described such that BNSF can determine where it will occur in both the horizontal and vertical plane. The general policy of the Burlington Northern and Santa Fe (BNSF) with regard to bridge and related crash wall construction is to follow the current recommendations of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Current AREMA recommended practice in Manual for Railway Engineering Chapter 8 (Art. 2.1.5.1). Crash Walls will not be required for the construction of the Baseline Street Overpass Project, U.S. D.O.T. No. 26112Y, as provided for in Article I of this Agreement.

For the permanent Structure, SANBAG will submit plans showing the least vertical clearance from top of the most elevated rail of existing and future tracks to the lowest point of the proposed Structure. Prior to beginning construction of the permanent Structure, the top of rail elevations should be checked and verified that they have not changed from the assumed elevations utilized for the design of the bridge.

Prior to issuing any invitation to bid on construction of the Structure, SANBAG should conduct a pre-bid meeting where prospective Contractors have the opportunity to communicate with BNSF personnel regarding site specific train speeds, train density, and general safety requirements for men and equipment working near live tracks. Any invitation to bid and specifications for the Structure must be submitted to BNSF for review and approval prior to letting of bids for the Project.

BRIDGE CONSTRUCTION:

After awarding the bid, but prior to the Contractor entering BNSF's railroad corridor or property, SANBAG should conduct a pre-construction meeting with BNSF personnel in attendance to reiterate the safety requirements of construction activity adjacent to live tracks.

During construction, BNSF may require an independent engineering inspector to be present during certain critical activities of the Project, including but not limited to: driving foundation piles, erecting falsework, construction of shoring and retaining walls, placing concrete, placing soil backfill and compaction processes. SANBAG shall reimburse BNSF for all costs of supplemental inspection services.

Within 90 days of the conclusion of the Project and final acceptance by BNSF, SANBAG will provide BNSF with a complete electronic set of the bridge plans. BNSF will also accept a marked up paper copy of the bridge plans

labeled "As Built". The marked up paper copy of the plans will reflect any and all deviations from the original plans that occurred during construction. The electronic set of the bridge plans will be submitted in Micro Station *.dgn electronic format (preferred) or AutoCAD *.dwg format. Electronic plans are to be submitted in the original format used for CAD plan preparation and not converted to another format prior to submission. The "As Built" plans shall show actual measured "as constructed" clearances shall be shown as well as depth, size and location of all foundation components. The plans shall show dimensioned locations of existing and relocated utilities. It is understood that BNSF prefers to receive the "As Built" plans in an electronic format.

BRIDGE MAINTENANCE:

STATE will be responsible for maintenance and repair of the Structure including the earth retention components, embankment slopes, erosion control, surface drainage, fencing, deck drains, landscaping, paint, walkways, handrails, lighting, and other improvements associated with the Project.

Fencing and other pedestrian access controls within BNSF's rail corridor and incorporated into the Project shall be designed and maintained by SANBAG through construction. Trespasser control shall be the responsibility of SANBAG through construction. Graffiti removal will be the responsibility of STATE.

BRIDGE INSPECTION:

STATE will conduct annual routine structural inspections. In the event of an earthquake, fire, flood, damage from vehicular impacts or other emergent situations, STATE will provide an immediate inspection by qualified personnel and notify BNSF of damage that may affect safe passage of trains. If necessary STATE will embargo weights or provide lane closures or other such measures to protect the structural integrity of the Structure such that there can be continuous safe passage of trains until repairs are made.

BRIDGE ALTERATIONS:

Except as provided otherwise by this Agreement, there will be no alterations made to the Structure that will alter the railroad vertical or horizontal clearances provided by the original design

It is expressly understood by STATE that the right to install utilities is restricted to the placement of underground utilities beneath BNSF's tracks located a minimum of fifty (50) feet from abutments, piers, piles, or footings. Under no circumstances will utilities be allowed to hang from the Structure, unless approved by BNSF. All utility crossings within the limits of BNSF's Rail Corridor will be covered by separate agreements between BNSF and each of the owners of the utilities.

EXHIBIT G

INSTRUCTIONS FOR PREPARATION OF DEMOLITION PLANS FOR STRUCTURES OVER THE BURLINGTON NORTHERN SANTA FE RAILROAD

SECTION I. GENERAL

A. The Contractor will abide by and adhere to the requirements of the Exhibit C. Should there be a discrepancy between the requirements contained in the Exhibit C and this Exhibit G, the Exhibit C will govern.

B. The Contractor's work shall in no way impede train operations.

1. The term "Overhead" refers to the structure to be demolished.
2. The words "demolition" and "removal" will be used interchangeably in this Exhibit G.
3. The term "Railroad" refers to the Railroad's Engineer or designated representative.

C. Safety takes precedence over productivity. The Contractor shall be responsible for planning and executing all procedures necessary to remove the Overhead in a safe, predictable manner. All employees of the Contractor and Subcontractors must be Safety Trained. Refer to <http://www.contractororientation.com>.

D. The Contractor shall develop a Demolition Plan ONLY AFTER CONSULTING WITH THE RAILROAD TO GET AN ESTIMATE OF THE RANGE OF WORK WINDOWS THAT MIGHT NORMALLY BE AVAILABLE FOR THE JOB SITE.

1. A Work Window is the elapsed time between approaching trains.
2. An estimate of the availability of Work Windows can be used by the Contractor to design a Demolition Plan. The estimated Work Window is a guideline and not to be considered as a guarantee for available working time.
3. Work Windows will vary significantly, depending on the location. Low speed - low train density tracks have predictable Work Windows. The opposite is true for high density- high speed main tracks. The Railroad shall, at its sole discretion, furnish a range of Work Windows that might be expected at a specific location under normal train traffic conditions.
4. The Contractor shall plan the demolition procedures based upon the smallest ESTIMATED Work Window. Do not assume the longest Work Window will be available on any given day. Do not assume the same Work Windows will be available from one day to the next.
5. The Contractor will give BNSF's Project Engineer at telephone number 909-386-4079, eight (8) weeks advance notice of the proposed times and dates for Work Windows. BNSF and the contractor will establish mutually agreeable Work Windows for the Project. Any request for Work Windows with less than eight (8) weeks advance notice will have a reduced probability of approval. BNSF has the right at any time to revise or change the Work Windows, due to train operations or service obligations. BNSF will not be responsible for any additional costs and expenses resulting from a change in Work Windows. Additional costs and expenses resulting from a change in Work Windows shall be accounted for in the contractor's expenses for the Project.

E. The Railroad's tracks and property shall be protected at all times.

1. Removal procedures shall take into account SEVERE WEATHER CONDITIONS, including high winds, heavy rains and snowfall accumulation.

2. The contractor shall ensure that all areas adjacent to active tracks shall remain free from hazards.
 - a) Trainmen must have an unobstructed walkway available parallel to all active tracks pursuant to the California Public Utilities Commission General Order 118.
 - b) All open excavations shall be protected with fencing.
 - c) Do not store materials or equipment within 25 feet of the centerline of an active track.
3. Protect the project area from vandalism.
 - a) Do not leave debris where vandals could place it on the tracks or drop it onto the tracks from the Overhead.
 - b) Secure all heavy equipment from potential movement by vandals.
 - c) Do not store flammable materials on railroad right of way. Remove combustible waste materials daily. Do not store fuel or other flammable liquids on railroad right of way.

F. All demolition materials and scrap shall be disposed of outside the Railroad right-of-way at no expense to the Railroad. At the conclusion of the project, the area must be left in a clean and graded condition to the exclusive satisfaction of the Railroad.

G. No work is allowed within 25 feet of the nearest track unless protected by a Railroad Flagger. Refer to Exhibit C Section 1.05, Protection of Railway Facilities and Railway Flagger Services for additional flagging requirements.

H. The staged demolition of any portion of the Overhead over or adjacent to operational tracks will not jeopardize the stability of other parts of the Overhead awaiting demolition.

1. Where multiple tracks are involved, the Demolition Plan should be engineered as much as practical such that no more than one track is rendered impassable at any given moment.

I. No blasting will be permitted on Railroad's right-of-way.

SECTION II. DEMOLITION PLAN

A. The Contractor shall submit a detailed Demolition Plan to the Railroad. The Demolition Plan shall encompass the following:

1. Provide a scale drawing showing the plan view, elevation and location of the Overhead and locations of any access roads needed on railroad right of way to access the job site. The as-built drawings may be used for the submittal provided the removal steps are clearly marked and legible.
2. Indicate the position of all railroad tracks below the bridge. Identify each track as mainline, siding, spur, etc. Identify locations where temporary crossings will be installed to cross equipment over each track.
3. List in sequential order, all procedures necessary to remove the bridge in a safe and controlled manner. Include step by step details of each sequence and the elapsed time required to execute the sequence. The Demolition Plan must specify which, if any, sequences will render a track impassable to trains during execution of the sequence. If more than one track is adjacent to the work area, specify which tracks will be impassable during execution of each sequence.
4. Include text, drawings or photos to communicate the types of equipment that will be utilized. Include diagrams showing the position of the equipment in relation to the tracks. Where cranes are to be used, furnish the lifting capacities of the crane at the anticipated radius and the weights of components to be removed.

5. For every sequence, specify the minimum horizontal clearance from centerline of track and the minimum vertical clearance above top of rail for equipment, falsework, rubble shields and temporary supports. If a crane is to be utilized, include clearances for the backswing radius of the crane counterweight and the position of the outriggers. Refer to the Frame Protection Details drawings, three sheets, attached hereto and made a part hereof, for the minimum allowable vertical and horizontal clearances.

6. If the Demolition Plan includes concrete demolition, include the details of rubble control such as maximum anticipated size of rubble, drop distance, shield size and shield position.

7. The Demolition Plan will indicate locations and types of temporary supports, shoring, cables or bracing required.

a) Excavations and shoring design shall be according to the attached "GENERAL SHORING REQUIREMENTS" drawings, two pages, attached hereto and made a part hereof.

b) Falsework shall be designed according to the State of California, Department of Transportation FALSEWORK MANUAL available at this Web Site:

[http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/FalseworkManual\(Rev32\).pdf](http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/FalseworkManual(Rev32).pdf)

c) Plans shall conform to the appropriate Federal, State and local regulations and building codes.

8. If any temporary supports interfere with the natural drainage along the Railroad right-of-way, a temporary drainage diversion plan shall be included in the Demolition Plan. The drainage plan shall route all surface water away from the railroad tracks.

a) Do not block drainage in side ditches with debris.

b) Do not place footing blocks in drainage ditches.

c) Surface runoff must be diverted away from the footing block excavations to avoid saturation of the underlying supporting soils.

9. The Demolition Plan shall include details, limits, and locations of protective shields or other measures designed to protect the rails, ties and ballast from falling debris. Include details of catchment apparatus necessary to protect the tracks from rolling debris that may fall onto side slopes. Include the design load for the shields for both the maximum static load and the maximum anticipated impact loads from falling debris. Specify the type of equipment that will be utilized to remove the debris and shields from operational tracks.

10. Protection of the track ballast section must be provided to avoid contamination of the rock with fine dust and mud produced during demolition activities. Filter fabric or some other effective means to prevent ballast contamination should be incorporated into the Demolition Plan.

11. All overhead and underground utilities in the area affected by removal of the bridge shall be located on the drawings, including any fiber optic, railroad signal, and communication lines.

12. Indicate the limits of demolition of substructures, including depths and dimensions of excavations that might be necessary to demolish buried footings.

13. The Demolition Plan should include details of planned on-site fire suppression.

B. The Contractor shall submit to the Railroad: three (3) complete sets of the Demolition Plan to BNSF's Assistant Director Structural Engineering for review and comments. The Demolition Plan should be sent in PDF format for files up to (2) megabytes by email attachment to: Donald.Lozano@bnsf.com. Should the Demolition Plan exceed a two (2) megabyte PDF file, a CD of the plans and specifications should be sent via overnight mail service to mailing address , 4515 Kansas Avenue, Kansas City, KS 66106.

1. The Plan shall be sealed by a Civil or Structural Engineer registered in the state where the proposed demolition will take place.
2. A minimum of four (4) weeks shall be expected for the Railroad's review after the complete submittal is received.
3. No removal operations will be permitted over the Railroad right of way until the submitted material has been reviewed and approved.

C. Approval and/or comments furnished by the Railroad in the course of review of the Contractor's Demolition Plan will not relieve the Contractor of the ultimate responsibility for the safe and secure demolition of the Overhead.

SECTION III. PROCEDURE

A. The Demolition Plan must be executed such that stability is continuously maintained for the standing portions of the Overhead over all tracks.

1. All members of the Overhead being demolished must be continuously supported to resist high winds, including wind buffets and suction forces generated by high speed trains.

B. Prior to proceeding with bridge removal, the sealing Civil or Structural Engineer, or his authorized representative, shall inspect all components of the temporary support shoring, including temporary bracing and protective coverings, insuring conformity with the working drawings.

1. The sealing Engineer shall certify in writing to the Railroad that the work is in conformance with the drawings and that the materials and workmanship are satisfactory.
2. A copy of this certification shall be available at the job site at all times.

C. All substructures shall be removed to at least six (6) feet below the final finished grade or at least six (6) feet below base of rail whichever is lower, unless otherwise specified by the Railroad.

D. All debris and refuse shall be removed from the railroad right of way by the Contractor. The premises shall be left in a neat and presentable condition to the exclusive satisfaction of the Railroad. Soils contaminated by fuel spills, hydraulic oil leaks, etc. will be removed from railroad right of way and replaced to the exclusive satisfaction of the Railroad.

E. If any hazardous materials are discovered, provide material protection as specified in local hazardous material codes and immediately contact the Railroad

1. If Contractor discovers any hazardous waste, hazardous substance, petroleum or other deleterious material, including but not limited to any non-containerized commodity or material, on or adjacent to Railway's Property, in or near any surface water, swamp, wetlands or waterways, while performing any work under this Agreement, Contractor must immediately: (a) notify the Railway's Resource Operations Center at 1(800) 832-5452, of such discovery; (b) take safeguards necessary to protect its employees, subcontractors, agents and/or third parties; and (c) exercise due care with respect to the release, including the taking of any appropriate measure to minimize the impact of such release.
2. If pipelines are attached to the Overhead, pipes must be purged of flammable or hazardous materials prior to beginning demolition.
3. Fuel spills, hydraulic fluid releases, equipment oil leaks or any other release of contaminants must be

reported to the Railroad. Contaminated soils must be removed and replaced to the satisfaction of the Railroad and local regulatory agencies.

F. The work progress shall be reviewed and logged by the Contractor's Engineer. Should an unplanned event occur, the Contractor shall inform the Railroad and submit a procedure to correct or remedy the occurrence.

G. Beam removal and all other demolition procedures shall take place as much as practicable with equipment positioned adjacent to and clear of all live tracks or positioned on the Overhead structure above the track. In the rare case that beams require removal with equipment positioned fouling a live track or from below the Overhead, the following steps shall be taken before beams are allowed to straddle the tracks:

1. Certain territories with high density train traffic, especially where multiple main tracks are affected, may not grant Work Windows on all tracks simultaneously. Beam removal from the underside of Overheads may not be possible unless the procedure can be accomplished in very short Work Windows or be engineered such that only one track is affected.
2. The work shall be scheduled well in advance but no later than the requirements in Section 1, paragraph 5 of this Exhibit G. The Work windows are subject to the Railroad's operational requirements for continuous train operations. The beam removal plan must be engineered to minimize the Work Window time.
3. The rails, ties and ballast shall be protected. No equipment will be crossed over or placed on the tracks unless pre-approved by the Railroad.
4. The beams shall be blocked to prevent the beams from coming into contact with the rails. Blocking shall not be placed on the rails or ties.
5. Upon approach of a train, the beams and all personnel and equipment will be moved a position to provide a minimum of 15 feet horizontal clearance and 21 ft. 6 in. vertical clearance from the nearest rail. Care must be exercised to insure that crane booms are rotated to a position parallel with the track.

SECTION IV. TRACK PROTECTION

A. The track protective cover shall be constructed before beginning bridge removal work and will be supported by falsework or members of the existing Overhead. The following are examples of protective covers that may be acceptable:

1. A decking supported by the bridge or a suspended cover from the bridge above the track clearance envelope.
2. A track shield cover over the tracks per the attached detail.
3. A framed cover outside the track clearance envelope.
4. A catcher box or loader bucket under decking and parapets overhanging the exterior girders.
5. Protection of the track ballast section must be provided to avoid contamination of the rock with fine dust and mud produced during demolition activities. Filter fabric or some other effective means to prevent ballast contamination should be incorporated into the Demolition Plan.

B. Construction equipment shall not be crossed over or placed on the tracks unless the rails, ties and ballast are protected against damage.

1. Track protection is required for all equipment including rubber tired equipment.

2. A list of equipment to be crossed over or positioned on the tracks along with the intended method of protection shall be submitted to the railroad for approval prior to use at the job site.

C. Temporary haul road crossings shall be either timbers or precast concrete panels. The type of crossing shall be determined by the Railroad.

1. Solid timbers or ballast with timber headers shall be used between multiple tracks.
2. If the job site is accessible to the public, all temporary haul road crossings shall be protected with barricades or locked gates when the Contractor is not actively working at the site.
3. Installation and removal of temporary track crossings for equipment shall be scheduled well in advance with the Railroad but no later than the requirements in Section 1, paragraph 5 of this Exhibit G.

SECTION V. CRANES

A. When cranes are operated over or adjacent to the tracks the following is required:

1. The Contractor shall verify that the foundations, soil conditions, and buried utility lines under the crane and crane outriggers can support the loads induced by the crane under an assumed maximum capacity lift. The size and material type of crane mats shall be rigid and of sufficient capacity to safely distribute the crane loads.
2. Front end loaders and backhoes cannot be used in place of a crane to lift materials over the tracks. These types of equipment do not have the necessary safety features built into the machines to circumvent overloading and tipping. Only cranes with the rated capacity to handle the loads may be used.
3. Additional track protection may be required for a crane when crossing over the track. The protection methods shall be submitted to the Railroad for review and comment well in advance of intended use.
4. Cranes and other equipment utilizing outriggers shall not place outriggers on the tracks or ballast.
5. Cranes or crane booms shall not be positioned within the track clearance envelope without Railroad Flagman protection. Cranes operating from a position farther than 25 ft. from the nearest track will need a Railroad Flagman present if the boom length is such that it could fall onto a track.
6. Upon approach of a train, the crane body shall be rotated to position the boom in a line parallel with the track. Any suspended load shall be made stationary by lowering it until contact is made with the ground. During passage of the train, the Crane Operator must stop all movements. Crane Operators shall remain in the cab with motor at idle with the load lines, boom, rotation and travel controls locked and stationary until the full length of the train has passed the job site.
7. Cranes will not be utilized during high winds.

SECTION VI. CUTTING TORCHES

A. When a cutting torch or welding equipment is used in the demolition process, the following steps shall be taken:

1. Fire suppression equipment is required on-site.
2. Do not use a torch over, between, or adjacent to the tracks unless a steel plate protective cover is used to shield against sparks and slag coming into contact with timber ties. Care shall be taken to make certain the use of a steel plate does not come in contact with the rails. See "Track Shield Details" for other requirements. Details of the shield shall be submitted to the Railroad for approval.
3. Wet the ties below the steel plate and wet other timbers and flammable demolition debris located near cutting areas.
4. Monitor the work site for at least three hours after cutting has ceased to detect a smoldering fire.

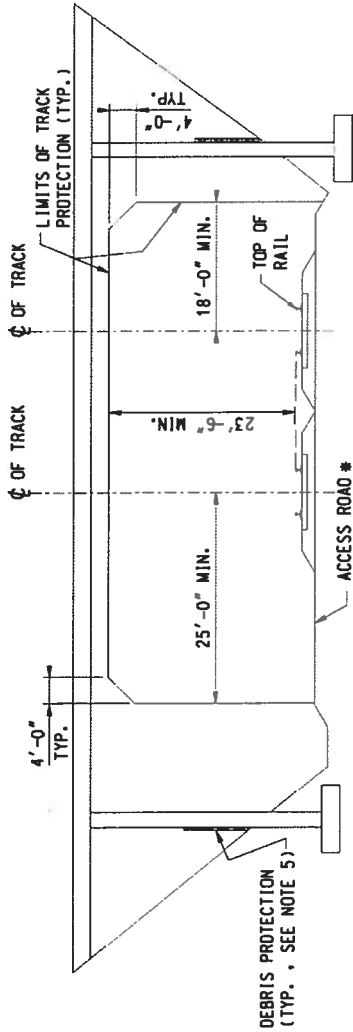
B. Extensive overhead cutting may require more robust fire suppression equipment and precautions than what would normally be required for routine cuts.

1. On days when extensive torch cutting is planned, the Contractor shall have a larger water supply on hand or take other measures as needed to effectively suppress fires.
2. Overhead torch cutting and welding must cease upon approach and passage of a train.
3. Extensive torch cutting shall not take place during high winds.
4. Contractor will clear vegetation and other combustible debris from the surrounding work areas prior to engaging in extensive torch cutting.

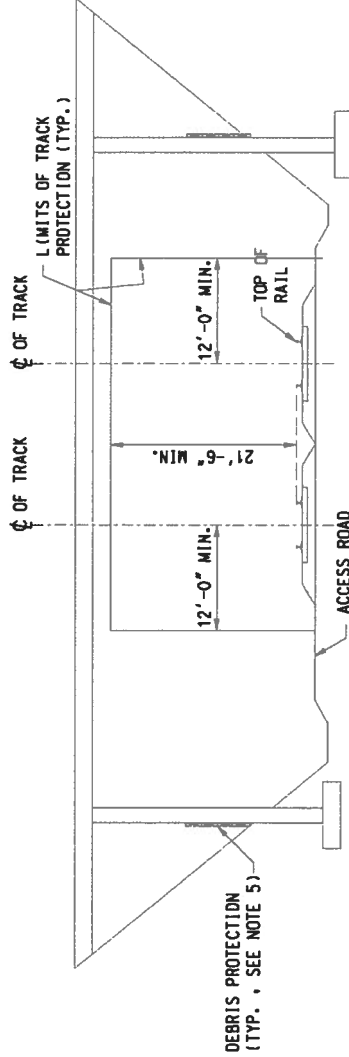
SECTION VII. UTILITIES

A. The demolition operations shall be planned such that overhead and underground utility lines are operating safely at all times. The utility lines shall be protected if affected by demolition operations. Underground utility lines shall be protected from concentrated soil loads under crane outriggers and heavy rubber tired front loaders or similar equipment. All the work associated with utility lines should be coordinated by the contractor with the respective utility companies.





BRIDGE ELEVATIONS
STANDARD LIMITS OF PROTECTION FOR FRAME PROTECTION



BRIDGE ELEVATION
MINIMUM LIMITS OF PROTECTION FOR FRAME PROTECTION
 (SPECIAL PERMISSION REQUIRED, SEE NOTE 1)

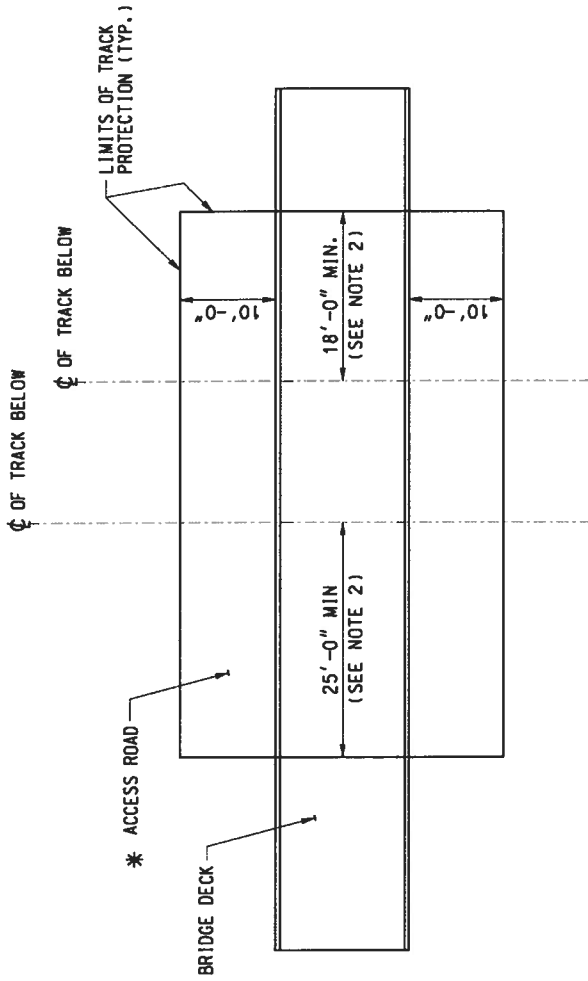
1. THE STANDARD LIMITS OF PROTECTION NOTED ARE THE MIN. CLEARANCES ALLOWED WITHOUT SPECIAL PERMISSION FROM THE RAILROAD. THE REDUCED CLEARANCES NOTED MAY BE ALLOWED BY THE RAILROAD. SPECIAL PERMISSION FOR THE REDUCED CLEARANCES IS REQUIRED FROM THE RAILROAD AND PUBLIC AGENCY.
 2. THE PROTECTION FRAME SHALL AS A MINIMUM MATCH THE DEMOLITION LIMITS SHOWN AND EXTEND PAST THE BRIDGE WIDTH AS SHOWN ON THE ATTACHED DEMOLITION PLAN SHEET.
 3. FOR ADDITIONAL CLEARANCE AND PROTECTION INFORMATION REFER TO CONTRACT EXHIBITS.
 4. THE PROTECTION FRAME SHALL PREVENT DEMOLITION DEBRIS, DUST AND FINE MATERIAL FROM FALLING INTO THE RAILROAD TRACKS, ACCESS ROAD OR TRAINS. THE FRAME SHALL BE DESIGNED BY THE CONTRACTOR TO SUPPORT THE ANTICIPATED DEMOLITION LOADS, AND IN ACCORDANCE WITH CALTRANS FALSEWORK MANUAL FOR STRUCTURES OVER THE RAILROAD.
 5. DEBRIS PROTECTION IS REQUIRED NEAR THE BASE OF THE SIDE SLOPES AND ADJACENT TO ROADS USED BY DEMOLITION EQUIPMENT TO PREVENT DEBRIS FROM ROLLING ONTO TRACK, ACCESS ROAD OR DITCH. USE TIMBERS AS REQUIRED TO STOP LARGE PIECES OF ROLLING DEBRIS.
 6. ANY ACTIVITY WITHIN 25 FEET OF THE NEAREST RAIL OF A TRACK REQUIRES A FLAGMAN.
- * IF NO ACCESS ROAD USE MIN. DIMENSION FROM OTHER SIDE OF DETAIL



DEMOLITION FRAME PROTECTION DETAILS

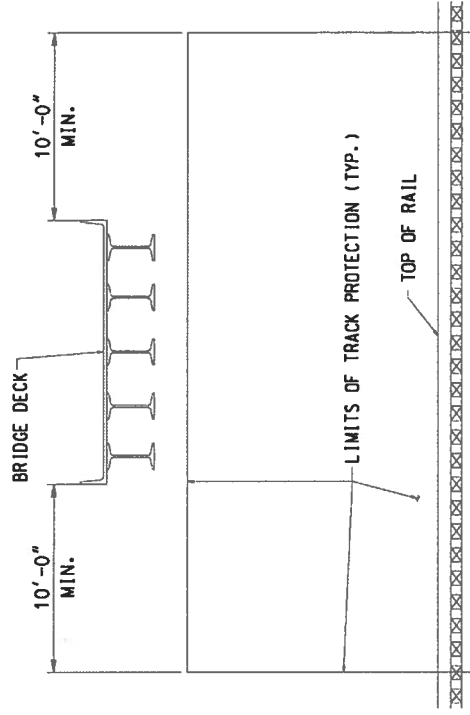
DATE: OCTOBER 17, 2007

SHEET: 1 OF 3



NOTES:

1. SEE GENERAL NOTES ON BRIDGE ELEVATION SHEET.
2. STANDARD LIMITS OF PROTECTION ARE SHOWN, FOR MIN. LIMITS OF PROTECTION DIMENSIONS, SEE BRIDGE ELEVATION. MINIMUM LIMITS OF PROTECTION.



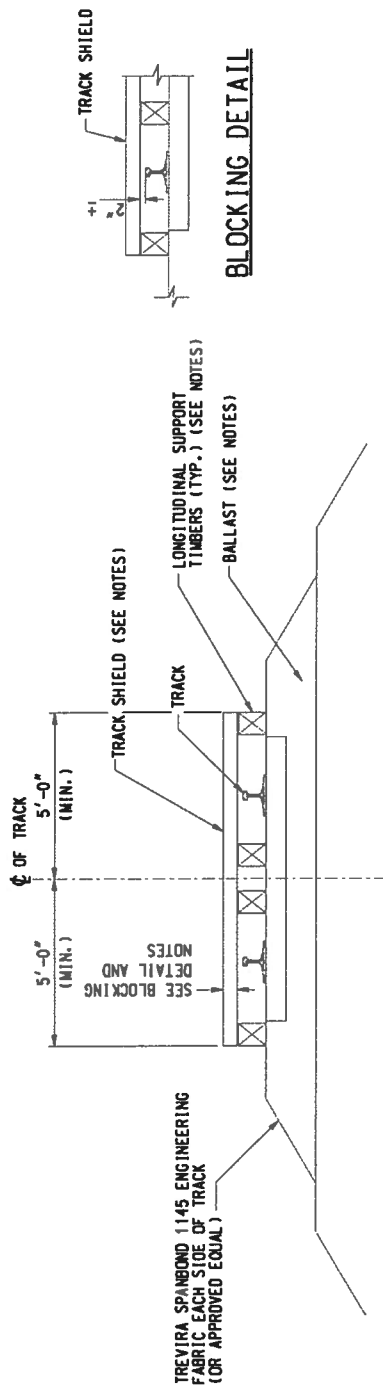
BRIDGE DECK CROSS SECTION STANDARD LIMITS OF PROTECTION



DEMOLITION FRAME
PROTECTION DETAILS

* IF NO ACCESS ROAD, USE MIN. DIMENSION FROM OTHER SIDE

DATE: OCTOBER 17, 2007 SHEET: 2 OF 3



TRACK SHIELD DETAIL
FOR DEBRIS FALLING FROM BRIDGE DECK REMOVAL
(WHEN TRACK TIME WINDOW IS AVAILABLE)

NOTES:

1. A FLAG MAN IS REQUIRED AT ALL TIMES DURING THE USE OF A TRACK SHIELD.
2. THE TRACK SHIELD SHALL BE DESIGNED BY THE CONTRACTOR AND SHALL BE OF SUFFICIENT STRENGTH TO SUPPORT THE ANTICIPATED LOADS, INCLUDING IMPACT AND PUNCTURE. THE SHIELD SHALL PREVENT MATERIALS AND EQUIPMENT OR DEBRIS FROM FALLING ONTO THE RAILROAD TRACK. ADDITIONAL LAYERS OF MATERIALS SHALL BE FURNISHED AS NECESSARY TO PREVENT FINE MATERIALS OR DEBRIS FROM SIFTING DOWN UPON THE TRACK.
3. THE SHIELD SHALL BE PREFABRICATED AND FURNISHED WITH LIFTING HOOKS TO SIMPLIFY REMOVAL.
4. THE SHIELD SHALL BE OF SUFFICIENT STRENGTH TO SPAN BETWEEN IT'S SUPPORTS WITHOUT BEARING UPON THE RAILS AND TO WITHSTAND DROPPING RUBBLE.
5. BEFORE REMOVAL THE SHIELD SHALL BE CLEANED OF ALL DEBRIS AND FINE MATERIAL. GEOFABRIC SHALL LINE THE BALLAST SECTION TO PREVENT CONTAMINATION.
6. THE TRACK SHIELD SHALL EXTEND AT LEAST 20 FEET BEYOND THE LIMITS OF DEMOLITION TRANSVERSE TO THE EDGE OF THE BRIDGE.
7. LONGITUDINAL SUPPORT TIMBERS FOR THE SHIELD SHALL NOT EXTEND ABOVE THE TOP OF RAIL WHEN THE SHIELD IS REMOVED. BLOCKING FROM THE TOP OF RAIL TO THE BOTTOM OF THE SHIELD MAY BE ATTACHED TO THE SHIELD. REMAINING TIMBERS SHALL BE ANCHORED.
8. FOR TRAIN PASSAGE, THE RUBBLE SHALL BE REMOVED TO A MINIMUM OF 8'-6" FROM THE NEAREST RAIL AND TO AN ELEVATION NO HIGHER THAN THE TOP OF RAIL.
9. AT THE END OF THE DAY, THE RUBBLE SHALL BE REMOVED COMPLETELY TO A MINIMUM OF 10'-0" FROM THE NEAREST RAIL AND DOWN TO ORIGINAL GRADE. GEOFABRIC BARRIER SHALL BE USED TO PREVENT BALLAST CONTAMINATION BY FINE MATERIALS.
10. CARE SHALL BE TAKEN TO NOT PLACE METAL ACROSS THE TRACK RAILS. RAILROAD COMMUNICATION ARE SENT THROUGH THE RAILS AND WILL BE DISRUPTED BY A SHORT BETWEEN RAILS.
11. DETAILS SHOWN APPLY FOR TIMBER TIES. SPECIAL DETAILS ARE REQUIRED FOR CONCRETE TIES.



DEMOLITION TRACK SHIELD DETAIL

DATE: OCTOBER 17, 2007

SHEET: 3 OF 3

OVERHEAD AGREEMENT

BNSF File No. 026110K
16th. Street Overhead
U.S. D.O.T. No. 026110K

This Agreement ("**Agreement**"), is executed to be effective as of this March day of 2009 ("**Effective Date**"), by and between BNSF RAILWAY COMPANY, a Delaware corporation ("**BNSF**"), and the STATE OF CALIFORNIA, acting through the Department of Transportation, hereinafter referred to as ("**STATE**") and the **SAN BERNARDINO ASSOCIATED GOVERNMENTS**, a body corporate and politic of the State of California, hereinafter referred to as ("**SANBAG**").

RECITALS:

WHEREAS, BNSF owns and operates a line of railroad in and through the City of San Bernardino, County of San Bernardino, State of California;

WHEREAS, STATE and The Atchison, Topeka and Santa Fe Railway Company, predecessor in interest to BNSF, hereinafter referred to as ("**Santa Fe**"), entered into an agreement dated February 27, 1958, carried in BNSF's records as Contract No. CL-61878, ("**Original Agreement**") which provided for the construction and maintenance of five (5) grade separation structures comprising of Ninth Street, Baseline Street, 16th Street, Massachusetts Avenue, and 27th Street Overheads, over and across BNSF's rail corridor hereinafter referred to as ("**Rail Corridor**"), and over its tracks;

WHEREAS, this Agreement covers the demolition and reconstruction of the 16th Street Overhead only;

WHEREAS, STATE and the San Bernardino Associated Governments hereinafter referred to as "SANBAG", propose to reconstruct Interstate Highway I-215, through the City of San Bernardino, in order to accommodate the construction of High Occupancy Vehicle (HOV) lanes involving the demolition and reconstruction of the 16th. Street Overhead by means of a six span 675 ft-9 in. long cast-in-place post-tensioned box girder bridge supported on multi-column bents and short seat abutments all supported on driven steel pipe pile foundations;

WHEREAS, STATE and SANBAG have entered into a Design Cooperative Agreement, dated September 3, 2008 providing for SANBAG's design for the reconstruction of the Segment 2 portion of the Interstate Highway I-215 reconstruction project, which includes the reconstruction of the 16th. Street Overhead.

WHEREAS, STATE and SANBAG will enter into a Construction Cooperative Agreement prior to the start of construction of the Project as described in Article I, Section 1 of this Agreement, that will provide for SANBAG's construction of the **Project** with STATE owning and maintaining the **Structure** as described in Article I, Section 1.

NOW, THEREFORE, in consideration of the mutual covenants and agreements of the parties contained herein, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

ARTICLE I – SCOPE OF WORK

1. The term "**Project**" as used herein includes any and all work related to the removal of the existing 16th. Street Overhead and the construction of a replacement 16th. Street Overhead, (hereinafter referred to as the "**Structure**"), including the installation of temporary shoring to accommodate the construction of Retaining Wall 137, more particularly described on the Exhibit A attached hereto and incorporated herein, including, but not limited to, any and all changes to telephone, telegraph, signal and electrical lines and appurtenances, temporary and permanent track work, fencing, grading, alterations to or new construction of drainage facilities, preliminary and construction engineering and contract preparation.

ARTICLE II – BNSF OBLIGATIONS

In consideration of the covenants of STATE and SANBAG set forth herein and the faithful performance thereof, BNSF agrees as follows:

1. Upon STATE's payment to BNSF of the sum of One Hundred Ten Thousand Five Hundred and Fifty Two and No/100 DOLLARS (\$110,552.00), BNSF shall grant to SANBAG, its successors and assigns, upon and subject to the terms and conditions set forth in this Agreement, a temporary non-exclusive license (hereinafter called, "Temporary Construction License") to construct the Structure across or upon the portion of BNSF's Rail Corridor described further on Exhibit A, excepting and reserving BNSF's rights, and the rights of any others who have obtained, or may obtain, permission or authority from BNSF, to do the following:

- (a) Operate, maintain, renew and/or relocate any and all existing railroad track or tracks, wires, pipelines and other facilities of like character upon, over or under the surface of said rail corridor;
- (b) Construct, operate, maintain, renew and/or relocate upon said Rail Corridor, without limitation, such facilities as the BNSF may from time to time deem appropriate, provided such facilities do not materially interfere with SANBAG'S construction of the Structure;
- (c) Use or operate the Rail Corridor as BNSF may from time to time deem appropriate, provided such use or operations does not materially interfere with STATE's use of the Structure.

The Temporary Construction License shall be in the form attached hereto as Exhibit B and by this reference made a part hereof, and shall be for a term beginning on the authorized commencement date as set forth hereinafter in Article III, Section 12 (c) ("Effective Date") and ending on the earlier of (i) completion of the Structure, or (ii) Thirty Nine (39) months following the Effective Date of the Temporary Construction License. The Temporary Construction License and related rights to be given by BNSF to SANBAG shall be without warranty of title of any kind, express or implied, and no covenant of warranty of title will be implied from the use of any word or words therein contained. The Temporary Construction License shall be for the Project and for no other purpose. SANBAG acknowledges and agrees that SANBAG shall not have the right, under the Temporary Construction License, to use the Structure. In the event STATE or SANBAG is evicted by anyone owning, or claiming title to or any interest in said Rail Corridor, BNSF will not be liable to STATE or SANBAG for any damages, losses or any expenses of any nature whatsoever. The granting of similar rights to others, subsequent to the date of this Agreement, will not impair or interfere with the rights granted to SANBAG pursuant to the Temporary Construction License.

Upon payment to BNSF of the additional sum of Five Thousand Three Hundred Ninety Six and No/100 DOLLARS (\$5,396.00), such payment to be made within thirty (30) days of the giving of the notice required pursuant to Article III, Section 15 of this Agreement, BNSF shall deliver to STATE, its successors and assigns, a perpetual easement to enter upon and use that portion of BNSF's Rail Corridor described therein as is necessary to use and maintain the Structure. The Easement shall be in the form attached hereto as Exhibit B-1 and by this reference made a part hereof.

2. BNSF will furnish all labor, materials, tools, and equipment for railroad work required for the construction of the Project, such railroad work and the estimated cost thereof being as shown on Exhibit D attached hereto and made a part hereof. In the event construction on the Project has not commenced within six (6) months following the Effective Date, BNSF may, in its sole and absolute discretion, revise the cost estimates set forth in said Exhibit D. In such event, the revised cost estimates will become a part of this Agreement as though originally set forth herein. Any item of work incidental to the items listed on Exhibit D not specifically mentioned therein may be included as a part of this Agreement upon written approval of SANBAG, which approval will not be unreasonably withheld. Construction of the Project will include the following principle elements of railroad work by BNSF:

- (a) Procurement of materials, equipment and supplies necessary for the railroad work;
- (b) Preliminary engineering, design, and contract preparation;

- (c) Furnishing of flagging services necessary for the safety of BNSF's property and the operation of its trains during construction of the Project as set forth in further detail on Exhibit C, attached to this Agreement and made a part hereof;
- (d) Furnishing engineering and inspection as required in connection with the construction of the Project;
- (e) Providing a contract project coordinator, at SANBAG's expense, to serve as a project manager for the Project and;
- (f) Protect the track for train operations during the removal of the footing for existing Bent No. 3 from BNSF property

3. BNSF will do all railroad work set forth in Article II, Section 2 above on an actual cost basis, when BNSF, in its sole discretion, determines it is required by its labor agreements to perform such work with its own employees working under applicable collective bargaining agreements or by contractor(s) if necessary.

4. SANBAG agrees to reimburse BNSF for work of an emergency nature caused by SANBAG or SANBAG's contractor in connection with the Project which is reasonably necessary for the immediate restoration of railroad operations, or for the protection of persons or BNSF property. Such work may be performed by BNSF without prior approval of SANBAG and SANBAG agrees to fully reimburse BNSF for all such emergency work.

5. BNSF may charge SANBAG for insurance expenses, including self-insurance expenses, when such expenses cover the cost of Employer's Liability (including, without limitation, liability under the Federal Employer's Liability Act) in connection with the construction of the Project. Such charges will be considered part of the actual cost of the Project, regardless of the nature or amount of ultimate liability for injury, loss or death to BNSF's employees, if any.

6. During the construction of the Project, BNSF will send SANBAG progressive invoices detailing the costs of the railroad work performed by BNSF under this Agreement. Pursuant to the California Prompt Payment Act, CALIFORNIA CODES, GOVERNMENT CODE, SECTION 927-927.12., SANBAG must reimburse BNSF for completed force-account work within forty-five (45) calendar days from the date of SANBAG's receipt of the invoice for such work. Upon completion of the Project, BNSF will send SANBAG a detailed invoice of final costs, segregated as to labor and materials for each item in the recapitulation shown on Exhibit D. If SANBAG fails to make payment of a BNSF invoice within said forty-five (45) days, SANBAG shall pay a penalty at a rate of 1 percent above the rate accrued on June 30 of the prior year by the Pooled Money Investment Account, not to exceed a rate of 15 percent pursuant to Section 927.6 (b) of said Government Code.

ARTICLE III – SANBAG OBLIGATIONS

In consideration of the covenants of STATE and BNSF set forth herein and the faithful performance thereof, SANBAG agrees as follows:

1. SANBAG shall furnish to BNSF and STATE plans and specifications for the Project together with calculations with the railroad clearances expressed in **English Units**. One complete reduced size 11" x 17" paper copy shall be submitted to BNSF's Director of Structural Engineering. A PDF copy of the plans and specifications should be sent to both BNSF'S Manager Public Projects and BNSF'S Director Structural Engineering. The PDF copy with a file size of two (2) megabytes or less should be sent via an email attachment. Should the PDF copy of the plans and specifications exceed two (2) megabytes, a CD (Compact Disk) of the plans and specifications should be sent via overnight mail service to both BNSF offices. The email and mailing addresses are included in Article V, Section 23. Sets of said plans shall be submitted to BNSF and STATE for approval prior to commencement of any construction. BNSF will give SANBAG final written approval of the plans and specifications substantially in the form of Exhibit E, attached to this Agreement and made a part hereof. Upon BNSF'S final written approval of the plans and specifications, said plans and specifications will become part of this Agreement and are hereby incorporated herein. Any approval of the plans and specifications by BNSF shall in no way obligate

BNSF in any manner with respect to the finished product design and/or construction. Any approval by BNSF shall mean only that the plans and specifications meet BNSF standard specifications, and such approval by BNSF shall not be deemed to mean that the plans and specifications or construction is structurally sound and appropriate or that such plans and specifications meet applicable regulations, laws, statutes or local ordinances and/or building codes.

2. SANBAG must provide for and maintain minimum vertical and horizontal clearances, as required and approved by BNSF as part of the plans and specifications for the Project.

3. SANBAG must make any and all arrangements for the installation or relocation of wire lines, pipe lines and other facilities owned by private persons, companies, corporations, political subdivisions or public utilities other than BNSF which may be necessary for the construction of the Project.

4. SANBAG must construct the Project as shown on the attached Exhibit A and do all work ("**SANBAG's Work**") provided for in the plans and specifications for the Project, except railroad work that will be performed by BNSF herein. SANBAG must furnish all labor, materials, tools and equipment for the performance of SANBAG's Work. The principal elements of SANBAG's Work are as follows:

- (a) Preliminary and final Engineering;
- (b) Demolition and removal of the existing 16th. Street Overhead;
- (c) Design and the Construction of the Structure;
- (d) All necessary grading and paving, including backfill of excavations and restoration of disturbed vegetation on BNSF's Rail Corridor;
- (e) Provide suitable drainage, both temporary and permanent;
- (f) Apply the D.O.T. Crossing Number 026110K in a conspicuous location on the Structure.
- (g) Job site cleanup including removal of all construction materials, concrete debris, surplus soil, refuse, contaminated soils, asphalt debris, litter and other waste materials to the satisfaction of BNSF;

5. SANBAG will install tie backs on BNSF's property required for installation of temporary shoring needed to construct a permanent retaining wall on State right of way with the retaining wall more or less paralleling the Rail Corridor. Upon removal of the temporary shoring, BNSF has agreed to allow the tie backs to be abandoned in place on BNSF's Rail Corridor as shown on Exhibit A.

6. SANBAG shall remove the portion of the footing for existing Bent No. 3 that is located on BNSF property; conditioned upon BNSF granting a work window for this task.

7. SANBAG's Work must be performed by SANBAG or SANBAG's contractor in a manner that will not endanger or interfere with the safe and timely operations of BNSF and its facilities.

8. SANBAG must require its contractor(s) to notify BNSF's Roadmaster at least thirty (30) calendar days prior to requesting a BNSF flagman in accordance with the requirements of Exhibit C attached hereto. Additionally, SANBAG must require its contractor(s) to notify BNSF's Manager of Public Projects thirty (30) calendar days prior to commencing work on BNSF property or near BNSF tracks.

9. SANBAG or its contractor(s) shall submit one reduced size 11" x 17" paper copy, including calculations, expressed in **English Units** of the plans and specifications for proposed shoring, falsework, or cribbing to be used over, under, or adjacent to BNSF'S tracks to BNSF'S Director Structural Engineering. SANBAG or its contractor(s) shall submit a PDF copy of the plans and specifications for the proposed shoring, falsework, or cribbing to both BNSF'S Manager Public Projects and BNSF'S Director Structural Engineering. The PDF copy with a file size of two (2) megabytes or less should be sent via an email attachment. Should the PDF copy of the plans and specifications exceed two (2) megabytes, a CD (Compact Disk) of the plans and specifications should be sent via overnight mail service to both BNSF offices for approval. The email and mailing addresses are included in Article V, Section 23. The shoring,

falsework or cribbing used by SANBAG'S contractor shall comply with the BNSF Bridge Requirements set forth on Exhibit F, and BNSF's Instructions FOR PREPARATION OF DEMOLITION PLANS as set forth in Exhibit G with both Exhibits attached to this Agreement and incorporated herein, and all applicable requirements promulgated by state and federal agencies, departments, commissions and other legislative bodies.

Falsework shall be designed according to the State of California, Department of Transportation FALSEWORK MANUAL available at this Web Site:

[http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/FalseworkManual\(Rev32\).pdf](http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/FalseworkManual(Rev32).pdf).

10. SANBAG must include the following provisions in any contract with its contractor(s) performing work on said Project:

- (a) The Contractor is placed on notice that fiber optic, communication and other cable lines and systems (collectively, the "Lines") owned by various telecommunications companies may be buried on BNSF's property or Rail Corridor. The locations of these Lines have been included on the plans based on information from the telecommunications companies. The contractor will be responsible for contacting BNSF's Project Engineer at telephone number 909 386 4079 and/or the telecommunications companies and notifying them of any work that may damage these Lines or facilities and/or interfere with their service. The contractor must also mark all Lines shown on the plans or marked in the field in order to verify their locations. The contractor must also use all reasonable methods when working in the BNSF Rail Corridor or on BNSF property to determine if any other Lines (fiber optic, cable, communication or otherwise) may exist.
- (b) Failure to mark or identify these Lines will be sufficient cause for any BNSF Representative to stop construction at no cost to SANBAG or BNSF until these items are completed.
- (c) In addition to the liability terms contained elsewhere in this Agreement, the contractor hereby indemnifies, defends and holds harmless BNSF for, from and against all cost, liability, and expense whatsoever (including, without limitation, attorney's fees and court costs and expenses) arising out of or in any way contributed to by any act or omission of Contractor, its subcontractors, agents and/or employees that cause or in any way or degree contribute to (1) any damage to or destruction of any Lines by Contractor, and/or its subcontractors, agents and/or employees, on BNSF's property or within BNSF's Rail Corridor, (2) any injury to or death of any person employed by or on behalf of any telecommunications company, and/or its contractor, agents and/or employees, on BNSF's property or within BNSF's Rail Corridor, and/or (3) any claim or cause of action for alleged loss of profits or revenue by, or loss of service by a customer or user of such telecommunication company(ies). **THE LIABILITY ASSUMED BY CONTRACTOR WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DAMAGE, DESTRUCTION, INJURY, DEATH, CAUSE OF ACTION OR CLAIM WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF BNSF, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, UNLESS SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE WILLFUL MISCONDUCT OR SOLE NEGLIGENCE OF BNSF.**
- (d) The Contractor will be responsible for the rearrangement of any facilities or Lines determined to interfere with the construction. The Contractor must cooperate fully with any telecommunications company(ies) in performing such rearrangements.

11. SANBAG must incorporate in each prime contract for construction of the Project, or the specifications therefore (i) the provisions set forth in Article III, Sections 5, 6, 7, 8, 9, 10 and 12; (ii) the provisions set forth in Article V, Sections 1, 2, 3, 4, 5, 6, 7, 11 and 12; and (iii) the provisions set forth in Exhibit C, Exhibit C-I, Exhibit F and Exhibit G, with the herein referenced Exhibits attached hereto and by reference made a part hereof.

12. Except as otherwise provided below in this Section 12, all construction work performed hereunder by SANBAG for the Project will be pursuant to a contract or contracts to be let by SANBAG, and all such contracts must include the following:

- (a) All work performed under such contract or contracts within the limits of BNSF's Rail Corridor must be performed in a good and workmanlike manner in accordance with plans and specifications approved by BNSF;
- (b) Changes or modifications during construction that affect safety or BNSF operations must be subject to BNSF's approval;
- (c) No work will be commenced within BNSF's Rail Corridor until each of the prime contractors employed in connection with said work must have (i) executed and delivered to BNSF a letter agreement in the form of Exhibit C-1, and (ii) delivered to and secured BNSF's approval of the required insurance; and
- (d) If it is in SANBAG's best interest, SANBAG may direct that the construction of the Project be done by day labor under the direction and control of SANBAG, or if at any time, in the opinion of SANBAG, the contractor has failed to prosecute with diligence the work specified in and by the terms of said contract, SANBAG may terminate its contract with the contractor and take control over the work and proceed to complete the same by day labor or by employing another contractor(s) provided; however, that any contractor(s) replacing the original contractor(s) must comply with the obligations in favor of BNSF set forth above and, provided further, that if such construction is performed by day labor, SANBAG will, at its expense, procure and maintain on behalf of BNSF the insurance required by Exhibit C-1.
- (e) To facilitate scheduling for the Project, SANBAG shall have its contractor give BNSF's Project Engineer at telephone number 909 386 4079 eight (8) weeks advance notice of the proposed times and dates for work windows. BNSF and SANBAG's contractor will establish mutually agreeable work windows for the Project. SANBAG shall inform its contractor that any request for work windows with less than eight (8) weeks advance notice will have a reduced probability of approval. BNSF has the right at any time to revise or change the work windows, due to train operations or service obligations. BNSF will not be responsible for any additional costs and expenses resulting from a change in work windows. Additional costs and expenses resulting from a change in work windows shall be accounted for in the contractor's expenses for the Project.
- (f) The plans and specifications for the Project must be in compliance with the Bridge Requirements set forth in Exhibit F and the INSTRUCTIONS FOR PREPARATION OF DEMOLITION PLANS set forth in Exhibit G, with both Exhibits attached to this Agreement and incorporated herein.

13. SANBAG must advise the BNSF Manager of Public Projects, in writing, of the completion date of the Project within thirty (30) days after such completion date. Additionally, SANBAG must notify BNSF's Manager of Public Projects, in writing, of the date on which SANBAG, and/or STATE and/or SANBAG's Contractor will meet with BNSF for the purpose of making final inspection of the Project.

14. **TO THE FULLEST EXTENT PERMITTED BY LAW, SANBAG HEREBY RELEASES, INDEMNIFIES, DEFENDS AND HOLDS HARMLESS BNSF, ITS AFFILIATED COMPANIES, PARTNERS, SUCCESSORS, ASSIGNS, LEGAL REPRESENTATIVES, OFFICERS, DIRECTORS, SHAREHOLDERS, EMPLOYEES AND AGENTS FOR, FROM AND AGAINST ANY AND ALL CLAIMS, LIABILITIES, FINES, PENALTIES, COSTS, DAMAGES, LOSSES, LIENS, CAUSES OF ACTION, SUITS, DEMANDS, JUDGMENTS AND EXPENSES (INCLUDING, WITHOUT LIMITATION, COURT COSTS AND ATTORNEYS' FEES) OF ANY NATURE, KIND OR DESCRIPTION OF ANY PERSON (INCLUDING, WITHOUT LIMITATION, THE EMPLOYEES OF THE PARTIES HERETO) OR ENTITY DIRECTLY OR INDIRECTLY ARISING OUT OF, RESULTING FROM OR RELATED TO (IN WHOLE OR IN PART) (I) THE USE, OCCUPANCY OR PRESENCE OF SANBAG, ITS CONTRACTORS, SUBCONTRACTORS, EMPLOYEES OR AGENTS IN, ON, OR ABOUT THE CONSTRUCTION SITE, (II) THE PERFORMANCE, OR FAILURE TO PERFORM BY SANBAG, ITS CONTRACTORS,**

SUBCONTRACTORS, EMPLOYEES, OR AGENTS, ITS WORK OR ANY OBLIGATION UNDER THIS AGREEMENT, (III) THE SOLE OR CONTRIBUTING ACTS OR OMISSIONS OF SANBAG, ITS CONTRACTORS, SUBCONTRACTORS, EMPLOYEES, OR AGENTS IN, ON, OR ABOUT THE CONSTRUCTION SITE, (IV) SANBAG'S BREACH OF THE TEMPORARY CONSTRUCTION LICENSE GRANTED TO SANBAG PURSUANT TO ARTICLE II OF THIS AGREEMENT, (V) ANY RIGHTS OR INTERESTS GRANTED TO SANBAG PURSUANT TO THE TEMPORARY CONSTRUCTION LICENSE DISCUSSED IN ARTICLE II OF THIS AGREEMENT, (VI) SANBAG'S OCCUPATION AND USE OF BNSF'S PROPERTY OR RAIL CORRIDOR, OR (VII) AN ACT OR OMISSION OF SANBAG OR ITS OFFICERS, AGENTS, INVITEES, EMPLOYEES OR CONTRACTORS OR ANYONE DIRECTLY OR INDIRECTLY EMPLOYED BY ANY OF THEM, OR ANYONE THEY CONTROL OR EXERCISE CONTROL OVER. THE LIABILITY ASSUMED BY SANBAG WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DAMAGE, DESTRUCTION, INJURY OR DEATH WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF BNSF, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, UNLESS SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE WILLFUL MISCONDUCT OR SOLE NEGLIGENCE OF BNSF.

15. SANBAG must give BNSF's Manager of Public Projects written notice to proceed ("**Notice to Proceed**") with the railroad work after receipt of necessary funds for the Project. BNSF will not begin the railroad work (including, without limitation, procurement of supplies, equipment or materials) until written notice to proceed is received from SANBAG. The Notice to Proceed must reference BNSF's file number 026110K.

ARTICLE IV - STATE OBLIGATIONS

IN CONSIDERATION of the covenants of BNSF and SANBAG herein contained and the faithful performance thereof, STATE agrees:

1. To permit SANBAG to act as the responsible lead agency to design and construct the Project.
2. STATE must make application to the Public Utilities Commission of the State of California ("**Commission**") for an order authorizing construction of the Project and to furnish to the Commission plans of the proposed construction, approved by BNSF, together with a copy of this agreement and to obtain all other required permits and approvals for the construction of the Project.
3. STATE will acquire all properties required to construct the Project and maintain the Structure;
4. In addition to the terms and conditions set forth elsewhere in this Agreement, including, but not limited to, the terms and conditions stated in Exhibit F, BNSF and STATE agree to the following terms upon completion of construction of the Project:
 - (a) STATE will own and maintain, at its sole cost and expense, the Structure, the highway approaches, and appurtenances thereto, lighting, drainage and any access roadways to BNSF gates installed pursuant to this Agreement.
 - (b) STATE will arrange for removal of graffiti from the Structure;
 - (c) STATE must maintain D.O.T. Crossing Number 026110K in legible condition in the conspicuous location on the Structure where applied by SANBAG during construction;
 - (d) It is understood by STATE that the right to install utilities is restricted to the placement of underground utilities beneath BNSF's tracks located a minimum of fifty (50) feet from abutments, piers, piles, or footings with the exception that upon BNSF's prior approval BNSF will permit selected utilities to be run through the deck of the Structure. Under no circumstances will utilities be allowed to hang from the Structure. All utility crossings within the limits of BNSF's Rail Corridor will be covered by separate agreements between BNSF and each of the owners of the utilities.
 - (e) Upon request from BNSF, STATE shall remove all trash and debris associated with the Structure from BNSF's property.

- (f) In conformance with and limited to the applicable effect of California Laws insofar as the indemnity and insurance provisions set forth in any of the preceding sections or any rider, amendment or addendum hereto, State is self-insured. If State performs (i) alterations or modifications to the Structure, or (ii) any maintenance or other work on the Structure with heavy tools, equipment or machinery at ground surface level horizontally within 25'-0" of the centerline of the nearest track, or (iii) any maintenance or other work outside the limits of the deck of the Structure vertically above the top of the rail, then STATE, shall provide BNSF defense and indemnification at least equal to the defense, indemnification and insurance provisions contained in Exhibit C-1 in accordance with California Government Code section 14662.5. Nothing herein shall be deemed to insure BNSF against its sole negligence or willful misconduct.

In the event any of the Work to be done on behalf of STATE upon BNSF's Rail Corridor is to be done by a contractor or subcontractor, said contractor or subcontractor shall provide to BNSF the insurance policies, certificates, binders, and/or endorsements in favor of BNSF as contained in said Exhibit C-1 as the same may be revised from time to time.

5. Subject to the restrictions imposed by Article V, Section 11 below, STATE must notify and obtain prior authorization from BNSF's Manager of Public Projects before entering BNSF's Rail Corridor for maintenance purposes. If the construction work hereunder is contracted, STATE must require its prime contractor(s) to comply with the obligations set forth in Exhibit C, Exhibit C-1 and Exhibit F, as the same may be revised from time to time. STATE will be responsible for its contractor(s) compliance with such obligations.

6. PURSUANT TO CALIFORNIA GOVERNMENT CODE SECTION 14662.5, STATE HEREBY AGREES TO INDEMNIFY AND HOLD HARMLESS BNSF FROM, AND TO REPAIR OR PAY FOR, ANY DAMAGE PROXIMATELY CAUSED BY REASON OF THE USES AUTHORIZED BY THE EASEMENT SET FORTH IN EXHIBIT B-1 TO THIS AGREEMENT.

ARTICLE V – JOINT OBLIGATIONS

IN CONSIDERATION of the premises, the parties hereto mutually agree to the following:

1. All work contemplated in this Agreement must be performed in a good and workmanlike manner and each portion must be promptly commenced by the party obligated hereunder to perform the same and thereafter diligently prosecuted to conclusion in its logical order and sequence. Furthermore, any changes or modifications during construction which affect BNSF will be subject to BNSF's approval prior to the commencement of any such changes or modifications.

2. The work hereunder must be done in accordance with the Bridge Requirements set forth on Exhibit F, the Instructions For Preparation Of Demolition Plans as set forth in Exhibit G, and the detailed plans and specifications approved by BNSF.

3. SANBAG must require its contractor(s) to reasonably adhere to the Project's construction schedule for all Project work. The parties hereto mutually agree that BNSF's failure to complete the railroad work in accordance with the construction schedule due to inclement weather or unforeseen railroad emergencies will not constitute a breach of this Agreement by BNSF and will not subject BNSF to any liability. Regardless of the requirements of the construction schedule, BNSF reserves the right to reallocate the labor forces assigned to complete the railroad work in the event of an emergency to provide for the immediate restoration of railroad operations (BNSF or its related railroads) or to protect persons or property on or near any BNSF owned property. BNSF will not be liable for any additional costs or expenses resulting from any such reallocation of its labor forces. The parties mutually agree that any reallocation of labor forces by BNSF pursuant to this provision and any direct or indirect consequences or costs resulting from any such reallocation will not constitute a breach of this Agreement by BNSF.

4. BNSF shall have the right to request any SANBAG employee, or STATE employee, who enters BNSF's Rail Corridor and because of their incompetence, neglect of duty, unsafe conduct or misconduct

and/or they adversely affected BNSF's operations or facilities, be removed from the Rail Corridor. In the event SANBAG, or STATE elects not to honor such request, BNSF may stop work within its Rail Corridor until the matter has been fully resolved to BNSF's satisfaction. The party whose employee has been asked to leave the Rail Corridor will indemnify BNSF and the other parties against any claims arising from such removal.

5. BNSF: will have the right to stop construction work on the Project if any of the following events take place: (i) Contractor (or any of its subcontractors) performs the Project work in a manner contrary to the plans and specifications approved by BNSF; (ii) Contractor (or any of its subcontractors), in BNSF's opinion, prosecutes the Project work in a manner which is hazardous to BNSF property, facilities or the safe and expeditious movement of railroad traffic; (iii) the insurance described in the attached Exhibit C-1 is canceled during the course of the Project; or (iv) STATE fails to pay BNSF for the Easement pursuant to Article II, Section 1 of this Agreement. The work stoppage will continue until all necessary actions are taken by STATE, Contractor or its subcontractor to rectify the situation to the satisfaction of BNSF's Division Engineer or until additional insurance has been delivered to and accepted by BNSF. In the event of a breach of (i) this Agreement, (ii) the Temporary Construction License, or (iii) the Easement, BNSF may immediately terminate the Temporary Construction License or the Easement. Any such work stoppage under this provision will not give rise to any liability on the part of BNSF. BNSF's right to stop the work is in addition to any other rights BNSF may have including, but not limited to, actions or suits for damages or lost profits. In the event that BNSF desires to stop construction work on the Project, BNSF agrees to immediately notify the following individual in writing:

SANBAG Director of Freeway Construction
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410
Fax: (909) 388-2002.

6. SANBAG's or any STATE employee, agents, contractors, representatives and invitees shall wear Personal Protective Equipment ("PPE") when on the BNSF's Rail Corridor during construction of the Project or performing subsequent maintenance after completion of construction. The PPE shall meet applicable OSHA and ANSI specifications. Current BNSF PPE requirements are listed on the web site, www.contractororientation.com. A partial list of BNSF's PPE requirements include; a) safety glasses: permanently affixed side shields; no yellow lenses, b) hard hats with high visibility orange cover, c) safety shoes: hardened toe, above-the-ankle lace-up with a defined heel and d), high visibility retro-reflective orange vests are required as specified by BNSF's representative in charge of the Project. PPE requirements as defined on the web site, will be amended from time to time, and shall take precedence over the Partial list of requirements outlined in this Section 6 of Article V. Hearing protection, fall protection and respirators will be worn as required by State and Federal regulations.

7. SANBAG must supervise and inspect the operations of all SANBAG contractors to assure compliance with the plans and specifications approved by BNSF, the terms of this Agreement and all safety requirements of the BNSF railroad. If BNSF determines that proper supervision and inspection is not being performed by SANBAG personnel at any time during construction of the Project, BNSF has the right to stop construction (within or adjacent to its operating Rail Corridor). Construction of the Project will not proceed until SANBAG corrects the situation to BNSF's reasonable satisfaction. If BNSF feels the situation is not being corrected in an expeditious manner, BNSF will immediately notify SANBAG Director of Freeway Construction for appropriate corrective action.

8. The Project funding is contemplated to come from mixed sources including Federal funds. Pursuant FEDERAL-AID POLICY GUIDE, dated December 9, 1991, Transmittal 1 23 CFR 646B which states projects for the reconstruction of existing grade separations are deemed to generally be of no ascertainable net benefit to the railroad and there shall be no required railroad share of the costs. Additionally pursuant to the California Public Utilities Code 1202.5 (d) BNSF is not required to contribute to the cost to reconstruct the 16th. Street Overhead as BNSF did not contribute to the cost to construct the existing 16th. Street Overhead.

9. Pursuant to this section and Article II, Section 6 herein, SANBAG must reimburse BNSF in full for the actual costs of all work performed by BNSF under this Agreement.

10. All expenses detailed in statements sent to SANBAG pursuant to Article II, Section 6 herein will comply with the terms and provisions of the Federal Aid Highway Program Manual, U.S. Department of Transportation, as amended from time to time, which manual is hereby incorporated into and made a part of this Agreement by reference. The parties mutually agree that BNSF's preliminary engineering, design, and contract preparation costs described in Article II, Section 2 herein are part of the costs of the Project even though such work may have preceded the date of this Agreement and the issuance of Notice to Proceed as more particularly described in Article III, Section 15.

11. The parties mutually agree that no construction activities for the Project, nor future maintenance of the Structure once completed, that would interfere with operations of the Rail Corridor will be permitted during the fourth quarter of each calendar year. Emergency work will be permitted only upon prior notification to BNSF's Network Operations Center (telephone number: 800 832-5452). The parties hereto mutually understand and agree that trains cannot be subjected to delay during this time period.

12. Subject to the restrictions imposed by Article V, Section 11 above, the construction of the Project will not commence until SANBAG gives BNSF's Manager of Public Projects thirty (30) days prior written notice of such commencement. The commencement notice will reference BNSF's file number 026110K. and must state the time that construction activities will begin.

13. Within 90 days of the conclusion of the Project and final acceptance by BNSF, SANBAG must provide BNSF with a complete electronic set of the bridge plans with the railroad clearances (prepared in English Units). BNSF will also accept a marked up paper copy of the bridge plans labeled "As Built". The marked up copy of those plans will reflect any and all deviations from the original plans that occurred during construction. The electronic set of bridge plans will be submitted in Micro Station *.dgn electronic format (preferred) or AutoCAD *.dwg format. Electronic plans are to be submitted in the original format used for CAD plan preparation and not converted to another format prior to submission. The "As Built" plans shall show actual measured "as constructed" clearances as well as depth, size and location of all foundation components. The plans shall show dimensioned locations of existing and relocated utilities. The As Built plans must comply with the Bridge Requirements set forth on Exhibit F and depicts all information in BNSF engineering stationing and mile post pluses. The As Built plans must also include plan and profile, structural bridge drawings and specifications, and drainage plans. All improvements and facilities must be shown. It is understood that BNSF prefers to receive the "As Built" plans in an electronic format.

14. BNSF may, at its expense, make future changes or additions to the railroad components of the Structure if necessary or desirable, in BNSF's sole discretion, including, without limitation the following: (i) the right to raise or lower the grade or change the alignment of its tracks, (ii) the right to lay additional track or tracks, or (iii) the right to build other facilities in connection with the operation of its railroad. Such changes or additions must not change or alter the highway components of the Structure. If it becomes necessary or desirable in the future to change, alter, widen or reconstruct the highway components of the Structure to accommodate railroad projects, the cost of such work, including any cost incidental to alteration of railroad or highway facilities made necessary by any such changes to the Structure, will be divided between BNSF and STATE in such shares as may be mutually agreed to by the parties hereto. Any alteration or reconstruction of the highway components of the Structure will be covered by a Commission order.

15. STATE may, at STATE's sole expense, alter or reconstruct the highway components of the Structure if necessary or desirable, due to traffic conditions or pedestrian or other recreational traffic, provided, however, that any such alteration or reconstruction must not encroach further upon or occupy the surface of BNSF's Rail Corridor to a greater extent than is contemplated by the plans and specifications to be approved by BNSF pursuant to Article III, Section 1 herein, without obtaining BNSF's prior written consent and the execution of a supplement to this Agreement or the completion of a separate agreement. Any alteration or reconstruction of the highway components of the Structure will be covered by a Commission order.

16. Any books, papers, records and accounts of the parties hereto relating to the work hereunder or the costs or expenses for labor and material connected with the construction will at all reasonable times be open to inspection and audit by the agents and authorized representatives of the parties hereto and the Federal Highway Administration, for a period of three (3) years from the date of the final BNSF invoice under this Agreement.

17. The covenants and provisions of this Agreement are binding upon and inure to the benefit of the successors and assigns of the parties hereto. Notwithstanding the preceding sentence, no party hereto may assign any of its rights or obligations hereunder without the prior written consent of the other party.

18. In the event construction of the Project does not commence within three (3) years of the Effective Date, this Agreement will become null and void.

19. Neither termination nor expiration of this Agreement will release any party from any liability or obligation under this Agreement, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination or expiration.

20. To the maximum extent possible, each provision of this Agreement will be interpreted in such a manner as to be effective and valid under applicable law. If any provision of this Agreement is prohibited by, or held to be invalid under, applicable law, such provision will be ineffective solely to the extent of such prohibition or invalidity and the remainder of the provision will be enforceable.

21. Only that portion of the aforesaid Original Agreement between the STATE and Santa Fe that pertains to the 16th. Street Overhead as originally constructed shall terminate on the completion date of the Project as provided for in Article III, Section 13 of this Agreement. The Original Agreement shall remain in full force and effect for the remaining four grade separations, Ninth Street, Baseline Street, Massachusetts Avenue, and 27th Street until they are terminated by separate agreement. Such termination shall not release any party thereto from any liability or obligation thereunder, resulting from any act, omission or event happening prior to the date of termination or thereafter, in the event the terms of said Original Agreement provide that anything shall or may be done after termination thereof.

22. This Agreement (including exhibits and other documents, manuals, etc. incorporated herein), together with previously acquired and recorded property rights if any, is the full and complete agreement between BNSF, STATE and SANBAG with respect to the subject matter herein and supersedes any and all other prior agreements between the parties hereto.

23. Any notice provided for herein or concerning this Agreement must be in writing and will be deemed sufficiently given when sent by certified mail, return receipt requested, to the parties at the following addresses:

BNSF Railway Company:

BNSF's Manager of Public Projects
740 E. Carnegie Drive
San Bernardino, CA. 92408
Email: Melvin.Thomas@bnsf.com

Director Structural Engineering
4515 Kansas Avenue
Kansas City, KS 66106
Email: Byron.Burns@bnsf.com

SANBAG:

San Bernardino Associated Governments
1170 W. 3rd Street, 2nd. Floor
San Bernardino, CA 92410
Attn. Director of Freeway Construction
Fax: 909 388 2002

STATE:

Department of Transportation
Division of Right of Way – Railroad Agreements
1120 N. Street, MS 37
Sacramento, CA. 95814

IN WITNESS WHEREOF, the parties hereto have caused this Agreement to be executed and attested by its duly qualified and authorized officials as of the day and year first above written.

BNSF RAILWAY COMPANY

By: 
Printed Name: David L. Freeman
Title: Vice President Engineering


WITNESS:




SAN BERNARDINO ASSOCIATED GOVERNMENTS

By: 
Printed Name: Gary C. Ovitt
Title: President - Board of Directors

APPROVED AS TO FORM:


Jean-Rene Basle
SANBAG Counsel

STATE OF CALIFORNIA, acting by and through its
Department of Transportation

By: 
Printed Name: Donald E. Grebe
Title: Chief, Office of Project Delivery
Division of Right of Way and Land Surveys


Attorney
Department of Transportation


Approval Recommended
Department of Transportation

FORT WORTH, TEXAS
SCALE: AS NOTED
CALIFORNIA DIVISION
CAJON SUBDIVISION
LINE SEGMENT 7600

ELEVATION
1"=60'

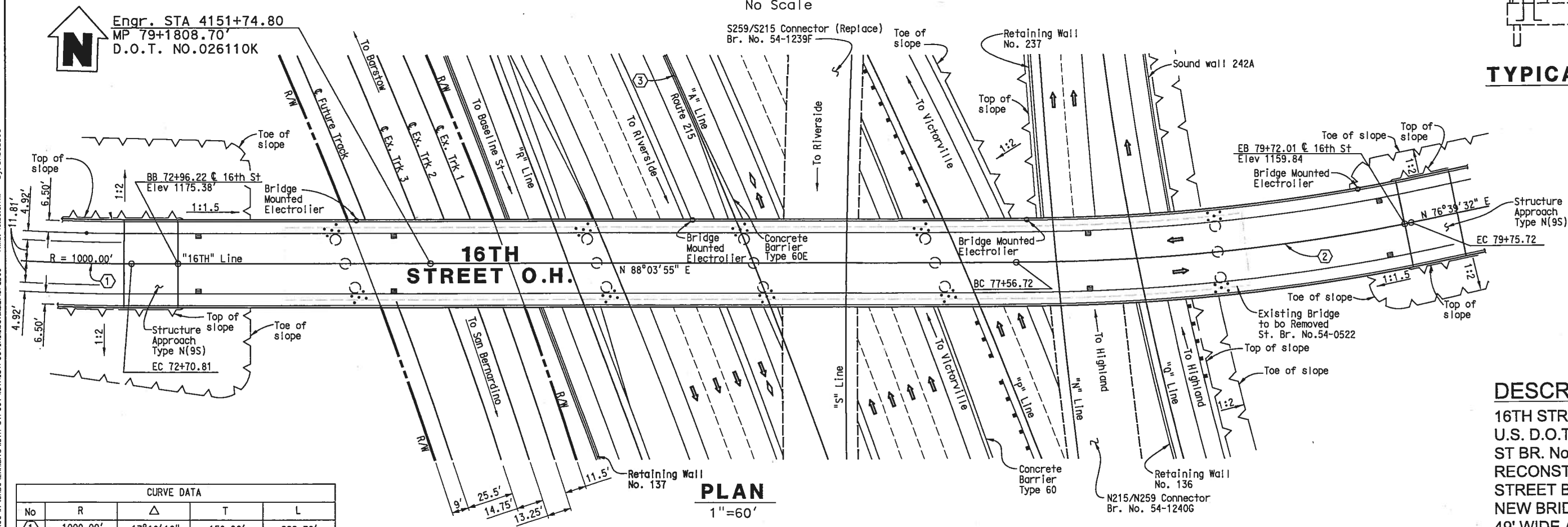
PROFILE GRADE

Chain Link Railing Type 3(mod) (typ)
Begin Bridge
91.86'
26.68' min. horiz. cir. 17.17'
137.80'
86.22'
100.07'
155.84'
104.00'
End Bridge
48.72'
24.36'
24.36'
1.13'
6.50'
4.92'
11.81'
11.81'
4.92'
6.50'
1.13'

S259/S215 Connector (Replace) Br. No. 54-1239F
N215/N259 Connector Br. No. 54-1240G
19.62' min vert clr
19.44' min vert clr
Slope Paving & Architectural Treatment
Architectural Treatment
1.13'
6.50'
4.92'
11.81'
11.81'
4.92'
6.50'
1.13'

Abut 1
Driven steel pile, Typ at abut.
Slope paving & Architectural Treatment
FG
Bent 2
Column Isolation Casing
Future BNSF Track 4
29.30' min vert clr
25.5'
14.75'
13.25'
11.5'
Bent 3
See Sheet 3 of 3 For Tie Back and Retaining Wall Details
Bent 4
Concrete Barrier Type 60E
16.98' min vert clr
52.51' min vert clr
54.42' min vert clr
Bent 5
46.08' min vert clr
Bent 6
Column Isolation Casing
Abut 7
Approx OG
Exist Box Culvert
Concrete Barrier Type 26 (Mod) (Typ)
CIP/PS Box Girder
0.46' wide x 0.13' deep groove (Typ)
6.23'
Exist 16th Street OC Br. No. 54-0522 to be removed
5.91' Dia Column Isolation Casing

Sta 72+17.85 BVC Elev 1170.86'
6.600%
688.98' VC R = -7.048%/Sta
Sta 79+06.82 PVCC Elev 1165.35'
Sta 81+03.68 EVC Elev 1147.73'
196.85' VC R = -2.50%/Sta
-8.200%
-9.700%

$$1'' = 20'$$


16TH STREET OVERHEAD
U.S. D.O.T. No. 026110K
ST BR. No. 54-1241
RECONSTRUCT THE EXISTING 16TH
STREET BRIDGE OVER I-215 WITH A
NEW BRIDGE APPROXIMATELY
49' WIDE AND 676' LONG.

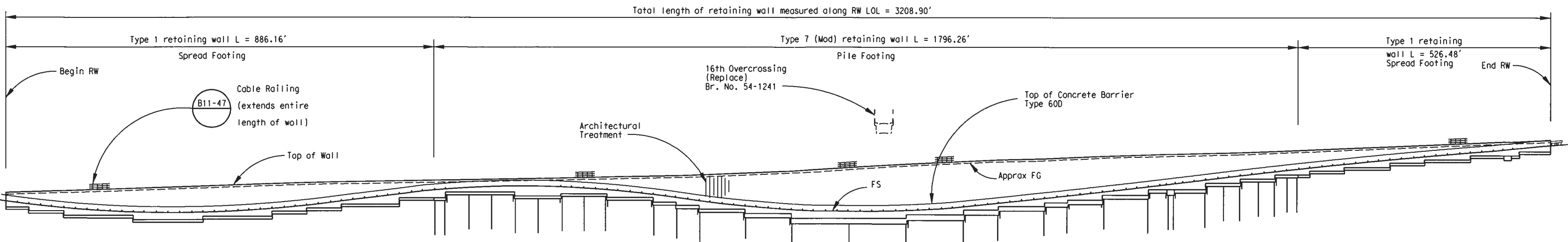
16th STREET OVERHEAD
EXHIBIT "A" Sheet 1 of 3

CURVE DATA				
No	R	Δ	T	L
①	1000.00'	17°10'18"	150.98'	299.70'
②	1100.04'	11°24'23"	109.86'	219.00'
③	3020.00'	52°30'21"	1489.49'	2767.52'

FORT WORTH, TEXAS
SCALE: AS NOTED
CALIFORNIA DIVISION
CAJON SUBDIVISION
LINE SEGMENT 7600

EXHIBIT "A"
ATTACHED TO A CONTRACT BETWEEN
BNSF RAILWAY COMPANY
AND
THE STATE OF CALIFORNIA
AND
SAN BERNARDINO ASSOCIATED GOVERNMENTS

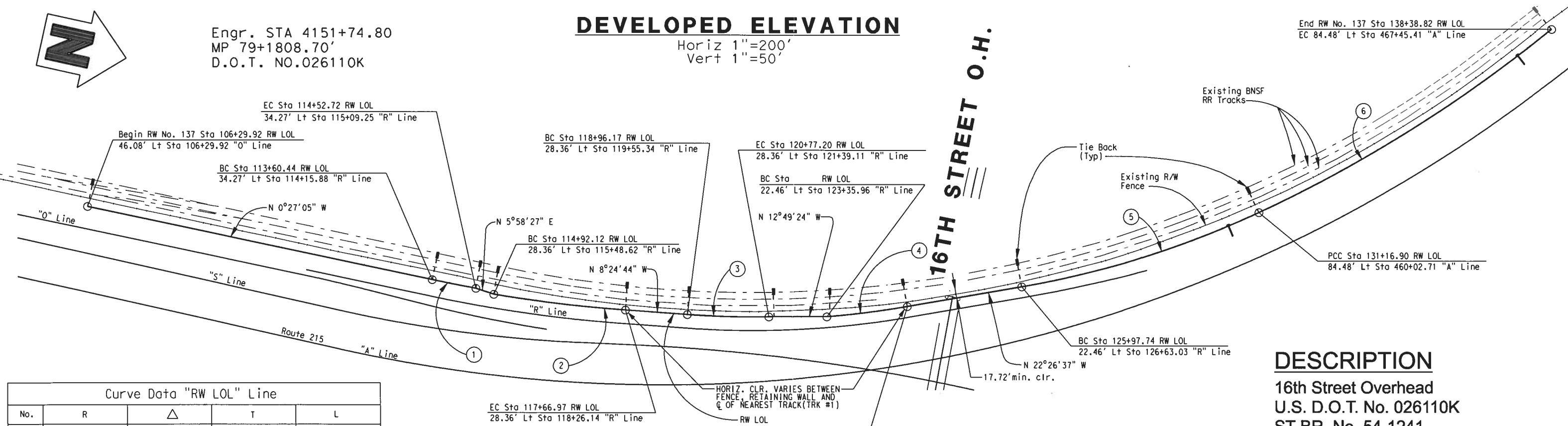
DAVID L. FREEMAN
VICE PRES. ENGINEERING



DEVELOPED ELEVATION

Horiz 1"=200'
Vert 1"=50'

Engr. STA 4151+74.80
MP 79+1808.70'
D.O.T. NO.026110K



DESCRIPTION

16th Street Overhead
U.S. D.O.T. No. 026110K
ST BR. No. 54-1241
RECONSTRUCT THE EXISTING 16TH STREET BRIDGE OVER I-215 WITH A NEW BRIDGE APPROXIMATELY 49' WIDE AND 676' LONG.

16th STREET OVERHEAD
EXHIBIT "A" Sheet 2 of 3

Curve Data "RW LOL" Line				
No.	R	Δ	T	L
①	2918.49'	1°48'42"	46.15'	92.28'
②	2924.39'	5°23'06"	137.53'	274.85'
③	1874.52'	5°32'00"	90.59'	181.03'
④	1880.43'	4°56'31"	81.15'	162.19'
⑤	1957.86'	15°11'35"	261.12'	519.16'
⑥	2935.52'	14°05'25"	362.79'	721.92'

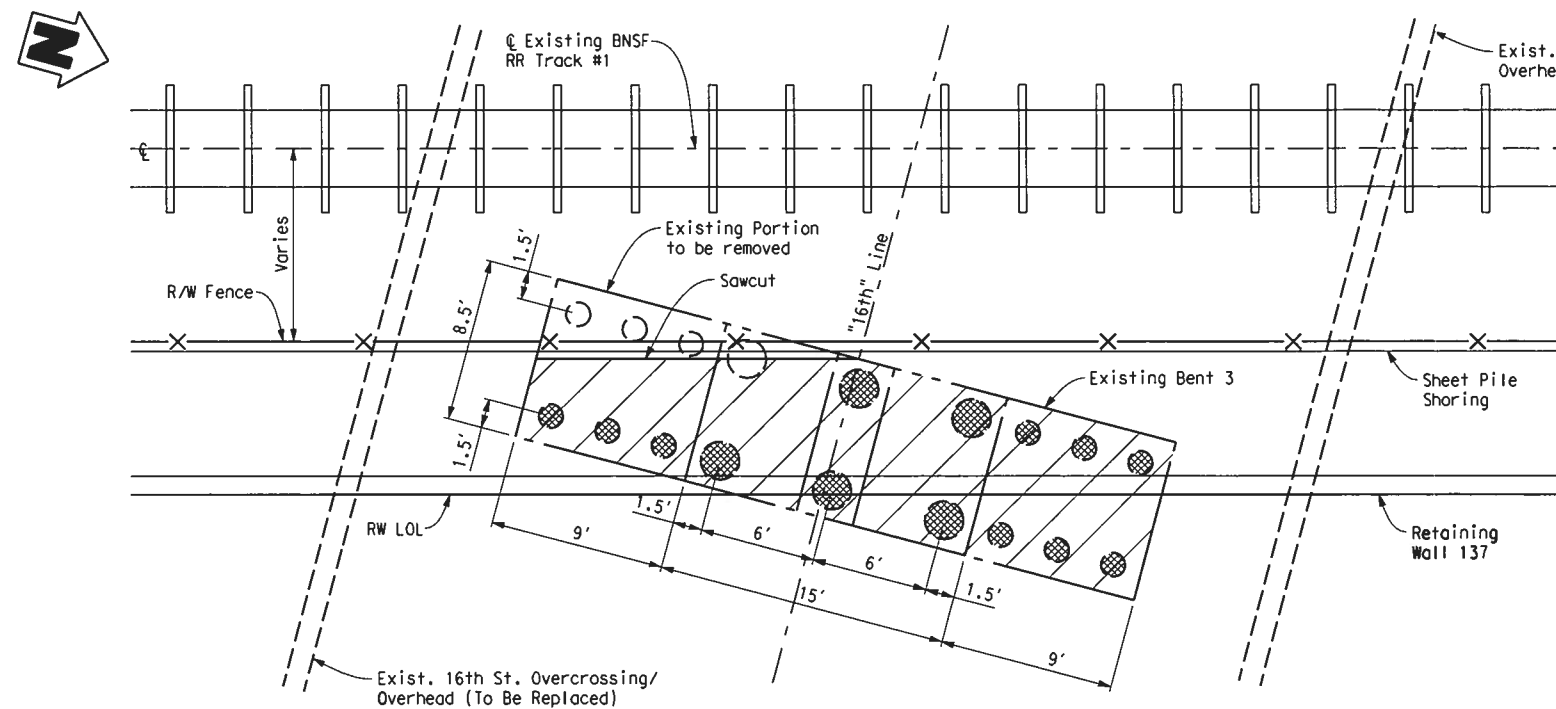
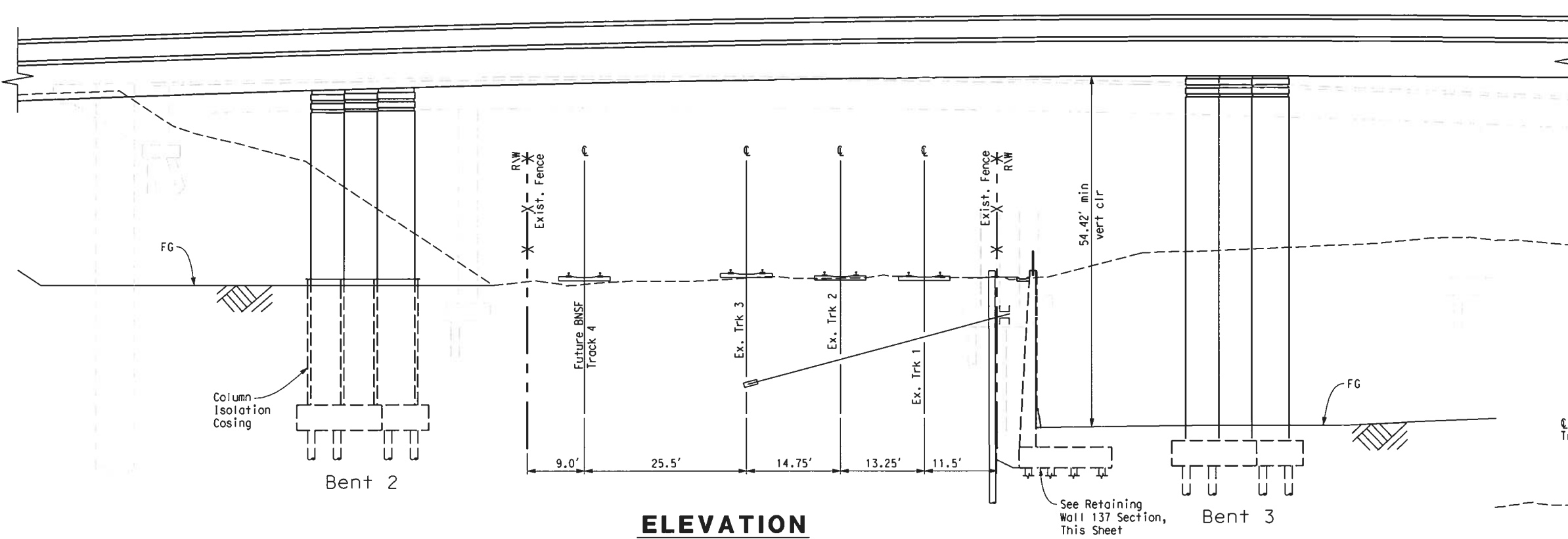
RETAINING WALL 137
PLAN

1"=200'

FORT WORTH, TEXAS
SCALE: AS NOTED
CALIFORNIA DIVISION
CAJON SUBDIVISION
LINE SEGMENT 7600

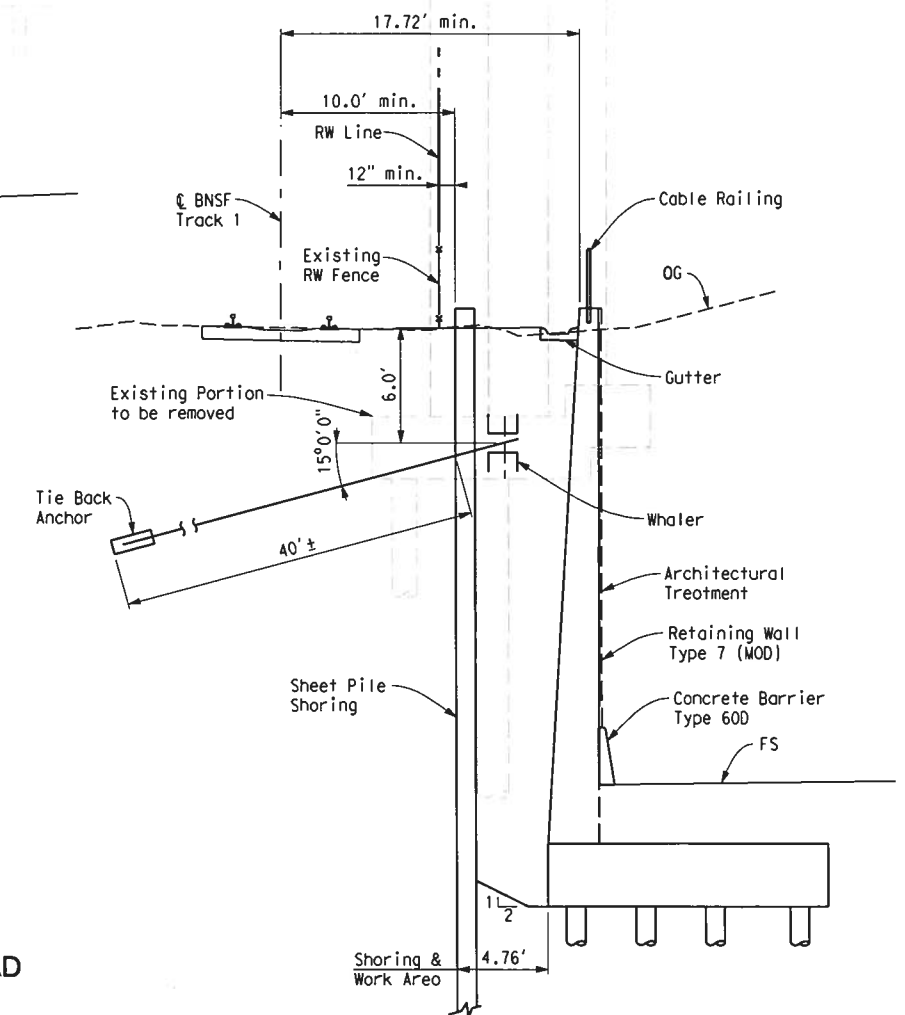
EXHIBIT "A"
ATTACHED TO A CONTRACT BETWEEN
BNSF RAILWAY COMPANY
AND
THE STATE OF CALIFORNIA
AND
SAN BERNARDINO ASSOCIATED GOVERNMENTS

DAVID L. FREEMAN
VICE PRES. ENGINEERING



DESCRIPTION

16TH STREET OVERHEAD
U.S. D.O.T. No. 026110K
ST BR. No. 54-1241
RECONSTRUCT THE EXISTING 16TH STREET BRIDGE OVER I-215 WITH A NEW BRIDGE APPROXIMATELY 49' WIDE AND 676' LONG.



16th STREET OVERHEAD
EXHIBIT "A" Sheet 3 of 3

EXHIBIT "B"

TEMPORARY CONSTRUCTION LICENSE

EXHIBIT B

**TEMPORARY CONSTRUCTION LICENSE
(16th. Street. Overhead)**

THIS TEMPORARY CONSTRUCTION LICENSE FOR the demolition, reconstruction and maintenance of the 16th. Street Overhead ("Temporary Construction License") is made and entered into as of the 29th day of April 2009, by and between BNSF RAILWAY COMPANY, a Delaware corporation ("Licensor"), and **SAN BERNARDINO ASSOCIATED GOVERNMENTS**, a body corporate and politic of the State of California ("Licensee").

A. Licensor owns or controls certain real property situated at or near the vicinity of San Bernardino, County of San Bernardino, State of California, at Mile Post 79.34, Line Segment 7600, [Project # 16th. Street Overhead], as described or depicted on Exhibit "A" and on PARCEL MAPS Exhibits "C", "D", "E", "F", "G", "H" and "I", Parcel No. 20628-3, Parcel No. 20628-4, Parcel No. 20628-5, Parcel No. 20628-6, Parcel No. 20628-7, and Parcel No. 20628-8 attached hereto and made a part hereof (the "Premises").

B. Licensor and Licensee have entered into that certain Overhead Agreement dated as of MARCH 4, 2009 concerning improvements on or near the Premises (the "Overhead Agreement").

C. Licensee has requested that Licensor grant to Licensee a temporary non-exclusive license over the Premises in connection with the demolition and reconstruction of the 16th. Street Overhead as defined in the Overhead Agreement.

D. Licensor has agreed to grant Licensee such license, subject to the terms and conditions hereinafter set forth.

NOW, THEREFORE, for and in consideration of the foregoing recitals which are incorporated herein, the mutual promises contained herein, and other good and valuable consideration, the receipt and sufficiency of which are hereby acknowledged, the parties agree as follows:

Section 1 Granting of License.

1.1 License Purpose. Licensee shall use the Premises for such purposes as are necessary and incidental to the demolition and reconstruction of the 16th. Street Overhead as is set forth in the Overhead Agreement.

1.2 Grant. Licensor does hereby grant unto Licensee a temporary non-exclusive license ("License") over the Premises for the License Purpose and for no other purpose. The License is granted subject to any and all restrictions, covenants, easements, licenses, permits, leases and other encumbrances of whatsoever nature whether or not of record, if any, relating to the Premises and subject to all with all applicable federal, state and local laws, regulations, ordinances, restrictions, covenants and court or administrative decisions and orders, including Environmental Laws (defined below) and zoning laws (collectively, "Laws"). Licensee may not make any alterations or improvements or perform any maintenance or repair activities within the Premises except in accordance with the terms and conditions of the Overhead Agreement.

1.3 Reservations by Licensor. Licensor excepts and reserves the right, to be exercised by Licensor and any other parties who may obtain written permission or authority from Licensor:

- (a) to install, construct, maintain, renew, repair, replace, use, operate, change, modify and relocate any existing pipe, power, communication, cable, or utility lines and appurtenances and other facilities or structures of like character (collectively, "Lines") upon, over, under or across the Premises;
- (b) to install, construct, maintain, renew, repair, replace, use, operate, change, modify and relocate any tracks or additional facilities or structures upon, over, under or across the Premises; and
- (c) to use the Premises in any manner as the Licensor in its sole discretion deems appropriate, provided Licensor uses all reasonable efforts to avoid material interference with the use of the Premises by Licensee for the License Purpose.

Section 2 Term of License. The term of the Temporary Construction License shall be for a term beginning on the authorized commencement date as set forth in Article III, Section 12 (c) ("Effective Date") of said Overhead Agreement and ending on the earlier of (i) completion of the Project, or (ii) Thirty Nine (39) months following the Effective Date of the Temporary Construction License, whichever occurs first. Said Temporary Construction License may be extended upon the written consent of both parties for an additional fee.

Section 3 No Warranty of Any Conditions of the Premises. Licensee acknowledges that Licensor has made no representation whatsoever to Licensee concerning the state or condition of the Premises, or any personal property located thereon, or the nature or extent of Licensor's ownership interest in the Premises. Licensee has not relied on any statement or declaration of Licensor, oral or in writing, as an inducement to entering into this Temporary Construction License, other than as set forth herein. LICENSOR HEREBY DISCLAIMS ANY REPRESENTATION OR WARRANTY, WHETHER EXPRESS OR IMPLIED, AS TO THE DESIGN OR CONDITION OF ANY PROPERTY PRESENT ON OR CONSTITUTING THE PREMISES, ITS MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE, THE QUALITY OF THE MATERIAL OR WORKMANSHIP OF ANY SUCH PROPERTY, OR THE CONFORMITY OF ANY SUCH PROPERTY TO ITS INTENDED USES. LICENSOR SHALL NOT BE RESPONSIBLE TO LICENSEE OR ANY OF LICENSEE'S CONTRACTORS FOR ANY DAMAGES RELATING TO THE DESIGN, CONDITION, QUALITY, SAFETY, MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE OF ANY PROPERTY PRESENT ON OR CONSTITUTING THE PREMISES, OR THE CONFORMITY OF ANY SUCH PROPERTY TO ITS INTENDED USES. LICENSEE ACCEPTS ALL RIGHTS GRANTED UNDER THIS TEMPORARY CONSTRUCTION LICENSE IN THE PREMISES IN AN "AS IS, WHERE IS" AND "WITH ALL FAULTS" CONDITION, AND SUBJECT TO ALL LIMITATIONS ON LICENSOR'S RIGHTS, INTERESTS AND TITLE TO THE PREMISES. Licensee has inspected or will inspect the Premises, and enters upon Licensor's rail corridor and property with knowledge of its physical condition and the danger inherent in Licensor's rail operations on or near the Premises. Licensee acknowledges that this Temporary Construction License does not contain any implied warranties that Licensee or Licensee's Contractors (as hereinafter defined) can successfully construct or operate the Improvements.

Section 4 Nature of Licensor's Interest in the Premises. LICENSOR DOES NOT WARRANT ITS TITLE TO THE PREMISES NOR UNDERTAKE TO DEFEND LICENSEE IN THE PEACEABLE POSSESSION OR USE THEREOF. NO COVENANT OF QUIET ENJOYMENT IS MADE. In case of the eviction of Licensee by anyone owning or claiming title to or any interest in

the Premises, or by the abandonment by Licensor of the affected rail corridor, Licensor shall not be liable to refund Licensee any compensation paid hereunder.

Section 5 Improvements. Licensee shall take, in a timely manner, all actions necessary and proper to the lawful establishment, construction, operation, and maintenance of the Improvements, including such actions as may be necessary to obtain any required permits, approvals or authorizations from applicable governmental authorities. Any and all cuts and fills, excavations or embankments necessary in the construction, maintenance, or future alteration of the Improvements shall be made and maintained in such manner, form and extent as will provide adequate drainage of and from the adjoining lands and premises of the Licensor; and wherever any such fill or embankment shall or may obstruct the natural and pre-existing drainage from such lands and premises of the Licensor, the Licensee shall construct and maintain such culverts or drains as may be requisite to preserve such natural and pre-existing drainage, and shall also wherever necessary, construct extensions of existing drains, culverts or ditches through or along the premises of the Licensor, such extensions to be of adequate sectional dimensions to preserve the present flowage of drainage or other waters, and of materials and workmanship equally as good as those now existing. In the event any construction, repair, maintenance, work or other use of the Premises by Licensee will affect any Lines, fences, buildings, improvements or other facilities (collectively, "Other Improvements"), Licensee will be responsible at Licensee's sole risk to locate and make any adjustments necessary to such Other Improvements. Licensee must contact the owner(s) of the Other Improvements notifying them of any work that may damage these Other Improvements and/or interfere with their service and obtain the owner's written approval prior to so affecting the Other Improvements. Licensee must mark all Other Improvements on the Plans and Specifications and mark such Other Improvements in the field in order to verify their locations. Licensee must also use all reasonable methods when working on or near Licensor's property to determine if any Other Improvements (fiber optic, cable, communication or otherwise) may exist.

Section 6 Taxes. Licensee shall pay when due any taxes, assessments or other charges (collectively, "Taxes") levied or assessed upon the Improvements by any governmental or quasi-governmental body or any Taxes levied or assessed against Licensor or the Premises that are attributable to the Improvements. In the event of Licensee's failure to do so, if Licensor shall become obligated to do so, Licensee shall be liable for all costs, expenses and judgments to or against Licensor, including all of Licensor's legal fees and expenses.

Section 7 Environmental. Licensee shall be bound by and hereby agrees to the environmental provisions set forth in Exhibit B-1, Exhibit C, and Exhibit G, which are attached to and made a part of the Overhead Agreement as if fully set forth herein.

Section 8 Default and Termination.

8.1 Licensor's Performance Rights. If at any time Licensee, or Licensee's Contractors, fails to properly perform its obligations under this Temporary Construction License, Licensor, in its sole discretion, may: (i) seek specific performance of the unperformed obligations, or (ii) at Licensee's sole cost, may arrange for the performance of such work as Licensor deems necessary for the safety of its rail operations, activities and property, or to avoid or remove any interference with the activities or property of Licensor, or anyone or anything present on the rail corridor or property with the authority or permission of Licensor. Licensee shall promptly reimburse Licensor for all costs of work performed on Licensee's behalf upon receipt of an invoice for such costs. Licensor's failure to perform any obligations of Licensee or Licensee's Contractors shall not alter the liability allocation set forth in this Temporary Construction License.

8.2 Effect of Termination or Expiration. Neither termination nor expiration will release Licensee from any liability or obligation under this License, whether of indemnity or otherwise, resulting from any acts, omissions or events happening prior to the date of termination or expiration, or, if later, the date the Premises are restored as required by Section 9.

8.3 Non-exclusive Remedies. The remedies set forth in this Section 8 shall be in addition to, and not in limitation of, any other remedies that Licensor may have under the Overhead Agreement, at law or in equity.

Section 9 Surrender of Premises. If said described premises, or any part thereof, shall at any time cease to be used by said Licensee, or by the public, for the purpose, as aforesaid for a period of two (2) consecutive years, or should they be converted to any other use whatsoever, or should the Licensee fail to perform any of the conditions herein expressed, then upon written request by the Licensor, Licensee shall immediately request abandonment in accordance with the applicable statutes or laws of the State of California, and, subject to appropriations being made for the purpose by the California Transportation Commission, Licensee shall restore Premises to their prior condition.

Section 10 Liens. Licensee shall promptly pay and discharge any and all liens arising out of any construction, alterations or repairs done, suffered or permitted to be done by Licensee on the Premises or attributable to Taxes that are the responsibility of Licensee pursuant to Section 6. Licensor is hereby authorized to post any notices or take any other action upon or with respect to the Premises that is or may be permitted by Law to prevent the attachment of any such liens to any portion of the Premises; provided, however, that failure of Licensor to take any such action shall not relieve Licensee of any obligation or liability under this Section 10 or any other section of this Temporary Construction License.

Section 11 Tax Exchange. Licensor reserves the right to assign this Temporary Construction License to Apex Property & Track Exchange, Inc. ("Apex"). Apex is a qualified intermediary within the meaning of Section 1031 of the Internal Revenue Code of 1986, as amended, and Treas. Reg. § 1.1031(k)-1(g), for the purpose of completing a tax-deferred exchange under said Section 1031. Licensor shall bear all expenses associated with the use of Apex, or necessary to qualify this transaction as a tax-deferred exchange, and, except as otherwise provided herein, shall protect, reimburse, indemnify and hold harmless Licensee from and against any and all reasonable and necessary additional costs, expenses, including, attorneys fees, and liabilities which Licensee may incur as a result of Licensor's use of Apex or the qualification of this transaction as a tax-deferred transaction pursuant to Section 1031. Licensee shall cooperate with Licensor with respect to this tax-deferred exchange, and upon Licensor's request, shall execute such documents as may be required to effect this tax-deferred exchange.

Section 12 Notices. Any notice required or permitted to be given hereunder by one party to the other shall be delivered in the manner set forth in the Overhead Agreement. Notices to Licensor under this License shall be delivered to the following address: BNSF Railway Company, Real Estate Department, 2500 Lou Menk Drive, Ft. Worth, TX 76131, Attn: Permits, or such other address as Licensor may from time to time direct by notice to Licensee.

Section 13 Recordation. It is understood and agreed that this Temporary Construction License shall not be recorded.

Section 14 Miscellaneous.

14.1 All questions concerning the interpretation or application of provisions of this Temporary Construction License shall be decided according to the substantive laws of the State of California without regard to conflicts of law provisions.

14.2 In the event that Licensee consists of two or more parties, all the covenants and agreements of Licensee herein contained shall be the joint and several covenants and agreements of such parties. This instrument and all of the terms, covenants and provisions hereof shall inure to the benefit of and be binding upon each of the parties hereto and their respective

legal representatives, successors and assigns and shall run with and be binding upon the Premises.

14.3 If any action at law or in equity is necessary to enforce or interpret the terms of this Temporary Construction License, the prevailing party or parties shall be entitled to reasonable attorneys' fees, costs and necessary disbursements in addition to any other relief to which such party or parties may be entitled.

14.4 If any provision of this Temporary Construction License is held to be illegal, invalid or unenforceable under present or future Laws, such provision will be fully severable and this Temporary Construction License will be construed and enforced as if such illegal, invalid or unenforceable provision is not a part hereof, and the remaining provisions hereof will remain in full force and effect. In lieu of any illegal, invalid or unenforceable provision herein, there will be added automatically as a part of this Temporary Construction License a provision as similar in its terms to such illegal, invalid or unenforceable provision as may be possible and be legal, valid and enforceable.

14.5 This Temporary Construction License is the full and complete agreement between Licensor and Licensee with respect to all matters relating to Licensee's use of the Premises, and supersedes any and all other agreements between the parties hereto relating to Licensee's use of the Premises as described herein. However, nothing herein is intended to terminate any surviving obligation of Licensee or Licensee's obligation to defend and hold Licensor harmless in any prior written agreement between the parties.

14.6 Time is of the essence for the performance of this Temporary Construction License.

14.7 The terms of the Overhead Agreement are incorporated herein as if fully set forth in this instrument which terms shall be in full force and effect for purposes of this License.

Witness the execution of this Temporary Construction License as of the date first set forth above.

LICENSOR:

BNSF RAILWAY COMPANY, a Delaware corporation

By:

Name: David P. Schneider

Title:

General Director - Land Revenue Management

LICENSEE:

SAN BERNARDINO ASSOCIATED GOVERNMENTS

a body corporate and politic of the State of California

By:

Printed Name: Gary C. Ovitt

Title: President - Board of Directors

EXHIBIT "A"

08-SBd-215-13.96 (KP)

#20628-3

Parcel 20628-3

A temporary easement for construction purposes and incidents thereto, over, under and across those portions of Lots 2 and 3, Block 53, in the City of San Bernardino, County of San Bernardino, State of California, as shown by the map of the survey of San Bernardino Rancho, filed in Book 7, page 2, County Recorder of said County, a portion being described in Director's Deeds to the Atchison, Topeka and Santa Fe Railroad Company, recorded November 25, 1959 in Book 4991, pages 66 Official records of said County, more particularly described as follows:

COMMENCING at the northwesterly terminus of Course "A" as described in said deed, said terminus being a point on the northeast side of the access controlled Railroad right of way common with State Route 215, also being on a non-tangent curve concave southwesterly having a radius of 783.479 meters (2570.46 feet), a radial line bears North 67°19'29" East; thence northerly along said non-tangent curve, also being the westerly right of way of State Route 215, through a central angle of 0°12'42" an arc distance of 2.895 meters (9.50 feet) to the **POINT OF BEGINNING**; thence South 88°03'51" West, 12.864 meters (42.21 feet) to a point which is distant 12 meters and radial from said westerly freeway right of way and the beginning of a non-tangent curve concave southwesterly having a radius of 771.479 meters (2531.09 feet), a radial line bears North 66°46'17" East; thence northwesterly along said non-tangent curve and concentric with said west right of way through a central angle of 18°14'05" an arc distance of 245.527 meters (805.53 feet); thence North 48°32'12" East, 12.000 meters (39.37 feet) to said west right of way and the beginning of a non-tangent curve concave southwesterly having a radius of 783.479 meters (2570.46 feet), a radial line bears North 48°32'12" East; thence southeasterly along said west right of way and said curve through a central angle of 18°34'35" an arc distance of 254.018 meters (833.39 feet) to the **POINT OF BEGINNING**.

08-SBd-215-13.67 (KP)

#20628-4

Parcel 20628-4

A temporary easement for construction purposes and incidents thereto, over, under and across those portions of that certain street commonly known as "I" Street, 25.146 meters (82.50 feet) wide and Lot 3, Block 53, in the City of San Bernardino, County of San Bernardino, State of California, as shown by the Map of the Survey of San Bernardino Rancho, filed in Book 7, page 2, County Recorder of said County, a portion being described in Director's Deeds to the Atchison,

Topeka and Santa Fe Railroad Company, recorded November 25, 1959 in Book 4991, pages 66 and 71 Official records of said County, more particularly described as follows:

COMMENCING at the northwesterly terminus of Course "A" as described in said deeds, said terminus being a point on the northeast side of the access controlled railroad right of way common with State Route 215, also being on a non-tangent curve concave southwesterly having a radius of 783.479 meters (2570.46 feet), a radial line bears North 67°19'29" East; thence southerly along said Course "A" and said non-tangent curve through a central angle of 1°38'19" an arc distance of 22.407 meters (73.51 feet) to the northeast corner of the property being herein described and the **POINT OF BEGINNING**; thence continuing southerly along said right of way and non-tangent curve, through a central angle of 20°15'48" an arc distance of 277.087 meters (909.08 feet); thence on a radial line South 89°13'36" West, 12.000 meters (39.37 feet) to the beginning of a non-tangent curve concave southwesterly having a radius of 771.479 meters (2531.09 feet); thence northerly along last said non-tangent concentric with and distant 12 meters from the said easterly railroad right of way curve through a central angle of 20°34'20" an arc distance of 277.003 meters (908.80 feet); thence North 88°03'51" East, 12.711 meters (41.70 feet) to the **POINT OF BEGINNING**.

08-SBd-215-13.83 (KP)

#20628-5

Parcel 20628-5

A temporary easement for construction purposes and incidents thereto, over, under and across those portions of Lot 3, Block 53, in the City of San Bernardino, County of San Bernardino, State of California, as shown by the Map of the Survey of San Bernardino Rancho, filed in Book 7, page 2, County Recorder of said County, a portion being described in Director's Deeds to the Atchison, Topeka and Santa Fe Railroad Company, recorded November 25, 1959 in Book 4991, pages 66 Official records of said County, more particularly described as follows:

COMMENCING at the northwesterly terminus of Course "A" as described in said deed, said terminus being a point on the northeast side of the access controlled railroad right of way common with State Route 215, also being on a non-tangent curve concave southwesterly having a radius of 783.479 meters (2570.46 feet), a radial line bears North 67°19'29" East; thence northerly along said curve through a central angle of 00°12'42" an arc distance of 2.895 meters (9.50 feet); thence South 88°03'51" West, 12.864 meters (42.21 feet) to the **POINT OF BEGINNING**; thence continuing South 88°03'51" West, 11.339 meters (37.20 feet) to the west line of the railroad right of way of said deed and the beginning of a non-tangent curve concave westerly and concentric with said east railroad right of way having a radius of 760.925 meters (2496.47 feet), a radial line bears North 66°27'41" East; thence northerly along said west line and last said curve through a central angle of 00°44'37"

an arc distance of 9.875 meters (32.40 feet); thence North 89°30'59" East, 11.520 meters (37.80 feet) to point which is distant 12 meters from said East railroad right of way being on a non-tangent curve concave westerly having a radius of 771.479 meters (2531.09 feet), a radial line bears North 66°03'47" East; thence southerly along said concentric curve through a central angle of 00°42'30" an arc distance of 9.538 meters (31.29 feet) to the **POINT OF BEGINNING**.

08-SBd-215-13.81 (KP)

#20628-6

Parcel 20628-6

A temporary easement for construction purposes and incidents thereto, over, under and across those portions of Lot 3, Block 53, in the City of San Bernardino, County of San Bernardino, State of California, as shown by the Map of the Survey of San Bernardino Rancho, filed in Book 7, page 2, County Recorder of said County, a portion being described in Director's Deeds to the Atchison, Topeka and Santa Fe Railroad Company, recorded November 25, 1959 in Book 4991, pages 66 Official records of said County, more particularly described as follows:

COMMENCING at the northwesterly terminus of Course "A" as described in said deed, said terminus being a point on the northeast side of the access controlled railroad right of way common with State Route 215, also being on a non-tangent curve concave southwesterly having a radius of 783.479 meters (2570.46 feet), a radial line bears North 67°19'29" East; thence southerly along said curve through a central angle of 1°38'19" an arc distance of 22.407 meters (73.51 feet); thence South 88°03'51" West, 12.711 meters (41.70 feet) to a point which is distant 12 meters from the east railroad right of way and the beginning of a non-tangent curve concave westerly having a radius of 771.479 meters (2531.09 feet), a radial line bears North 68°39'16" East and the **POINT OF BEGINNING**; thence southerly along a curve concentric with said right of way through a central angle of 1°05'07" an arc distance of 14.613 meters (47.94 feet); thence South 88°02'04" West, 11.124 meters (36.50 feet) to the west railroad right of way line of said deed and the beginning of a non-tangent curve concave westerly having a radius of 760.925 meters (2496.47 feet), a radial line bears North 69°28'36" East; thence northerly along said west line and last said curve through a central angle of 1°06'09" an arc distance of 14.643 meters (48.04 feet); thence North 88°03'51" East, 11.199 meters (36.74 feet) to the **POINT OF BEGINNING**.

08-SBd-215-14.17 (KP)
#20628-7

Parcel 20628-7

A temporary easement for construction purposes and incidents thereto, over, under and across that portion of Lot 2, Block 53, in the City of San Bernardino, County of San Bernardino, State of California, as shown by the Map of the Survey of San Bernardino Rancho, filed in Book 7, page 2, County Recorder of said County, described as follows:

BEGINNING at a point on the southwest right of way of State Route 215 common to the 74 feet wide Atchison, Topeka and Santa Fe Railroad right of way at engineers station 142+42.653, 32.679 meters left, as shown on Caltrans right of way map 403041-15 and also as engineers station 475+24.27, 76.02 feet left of centerline of improvement as shown on Caltrans right of way map 456025, also being the southwesterly terminus of that certain course described as "*thence North 52°16'32" West along last said parallel line 2,706.51 feet to said North line of Block 53*" in Parcel No. 2 (State No. 7522-D) in a deed to the State of California recorded November 25, 1959 in Book 4991, page 150 Official Records of said County; thence along said course and westerly right of way of State Route 215, North 52°15'27" West, 7.076 meters (23.21 feet); thence South 38°09'21" West, 1.500 meters (4.92 feet); thence South 52°15'27" East, 7.086 meters (23.25 feet) to the beginning of a curve concave southwesterly having a radius of 781.979 meters (2565.54 feet); thence southeasterly along said curve through a central angle of 10°47'39" an arc distance of 147.320 meters (483.33 feet); thence North 48°32'12" East, 1.500 meters (4.92 feet) to said right of way and the beginning of a non-tangent curve concave southwesterly having a radius of 783.479 meters (2570.46 feet), a radial line bears North 48°32'12" East; thence northwesterly along said right of way and said curve through a central angle of 10°47'39" and arc distance of 147.603 meters (484.26 feet) to the **POINT OF BEGINNING**.

08-SBd-215-13.38 (KP)
#20628-8

Parcel 20628-8

A temporary easement for construction purposes and incidents thereto, over, under and across that portion of that certain street commonly known as "I" Street, 25.146 meters (82.50 feet) wide, in the City of San Bernardino, County of San Bernardino, State of California, as shown by the Map of the Survey of San Bernardino Rancho, filed in Book 7, page 2, County Recorder of said County, of the land described as Parcel "B" in Director's Deed to the Atchison, Topeka and Santa Fe Railway Company, recorded on November 25, 1959 in Book 4991, page 71 of Official records of said County, described as follows:

COMMENCING at the centerline intersection of Magnolia Avenue and said "I" Street as shown by the Map of Sunrise Heights, filed in Book 23 of Maps, page 5

of said County; thence along said centerline of "I" Street, South 00°24'17" East, 7.766 meters (25.48 feet); thence North 89°35'43" East, 4.770 meters (15.65 feet) to the east line of said Parcel "B", also being the east right of way of State Route 215 and the **POINT OF BEGINNING**; thence along said east line and said right of way, South 00°25'12" East, 262.927 meters (862.62 feet); thence South 89°34'48" West, 1.500 meters (4.92 feet); thence North 00°25'12" West, 262.927 meters (862.62 feet) to the beginning of a curve concave westerly having a radius of 781.979 meters (2565.54 feet); thence northerly along said curve through a central angle of 0°21'12" and arc distance of 4.824 meters (15.83 feet); thence North 89°13'36" East, 1.500 meters (4.92 feet) to said right of way and the beginning a non-tangent curve concave westerly having a radius of 783.479 meters (2570.46 feet), a radial line bears North 89°13'36" East; thence southerly along said curve through a central angle of 0°21'12" and arc distance of 4.833 meters (15.86 feet) to the **POINT OF BEGINNING**.

The bearings and distances used in the above descriptions of parcels 20628-3, 20628-4, 20628-5, 20628-6, 20628-7 and 20628-8 are based on the California Coordinate System of 1983, Zone 5. Multiply distances shown by 1.000068345 to obtain ground level distances.

These real property descriptions have been prepared by me, or under my direction, in conformance with the Professional Land Surveyors Act.

Signature: 
Professional Land Surveyor

Date: Nov. 25, 2008



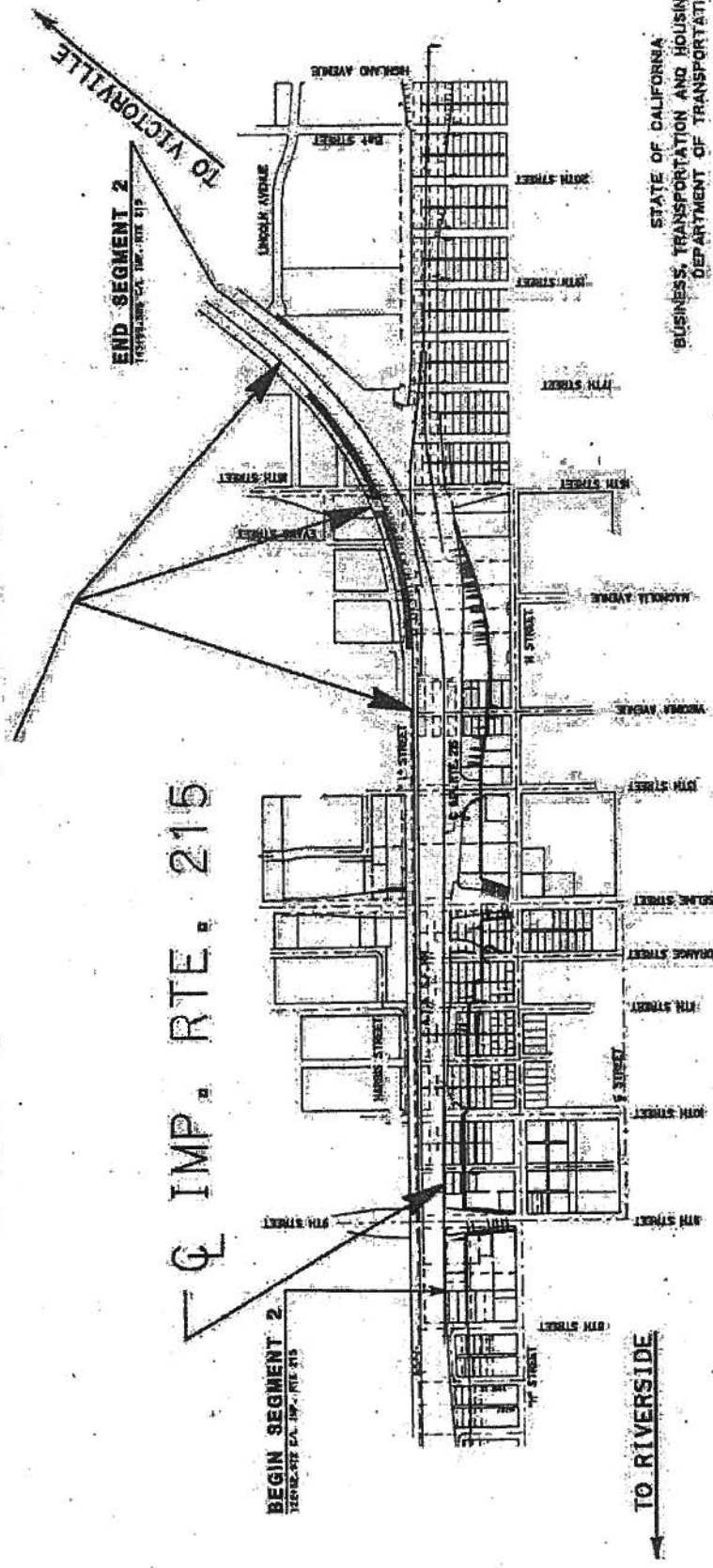


DIST.	COUNTY	ROUTE	KILOMETER POST
08	08d.	215	13.38-14.17

EXHIBIT "C"



**PARCEL No.s 20628-3, 20628-4, 20628-5,
20628-6, 20628-7 & 20628-8**



STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

RANCHO SAN BERNARDINO
M.B. 7 / 2

CITY OF
SAN BERNARDINO

PARCEL INDEX MAP

NO SCALE

DIST.	COUNTY	ROUTE	KILOMETER POST
08	SBD	215	13.82



EXHIBIT "D"

CITY OF
SAN BERNARDINO

CURVE DATA		
NO.	Δ	LENGTH
①	0°13'17"	760.925m (2496.47')
②	0°12'55"	783.479m (2570.46')
③	0°13'12"	760.925m (2496.47')
④	0°12'42"	783.479m (2570.46')



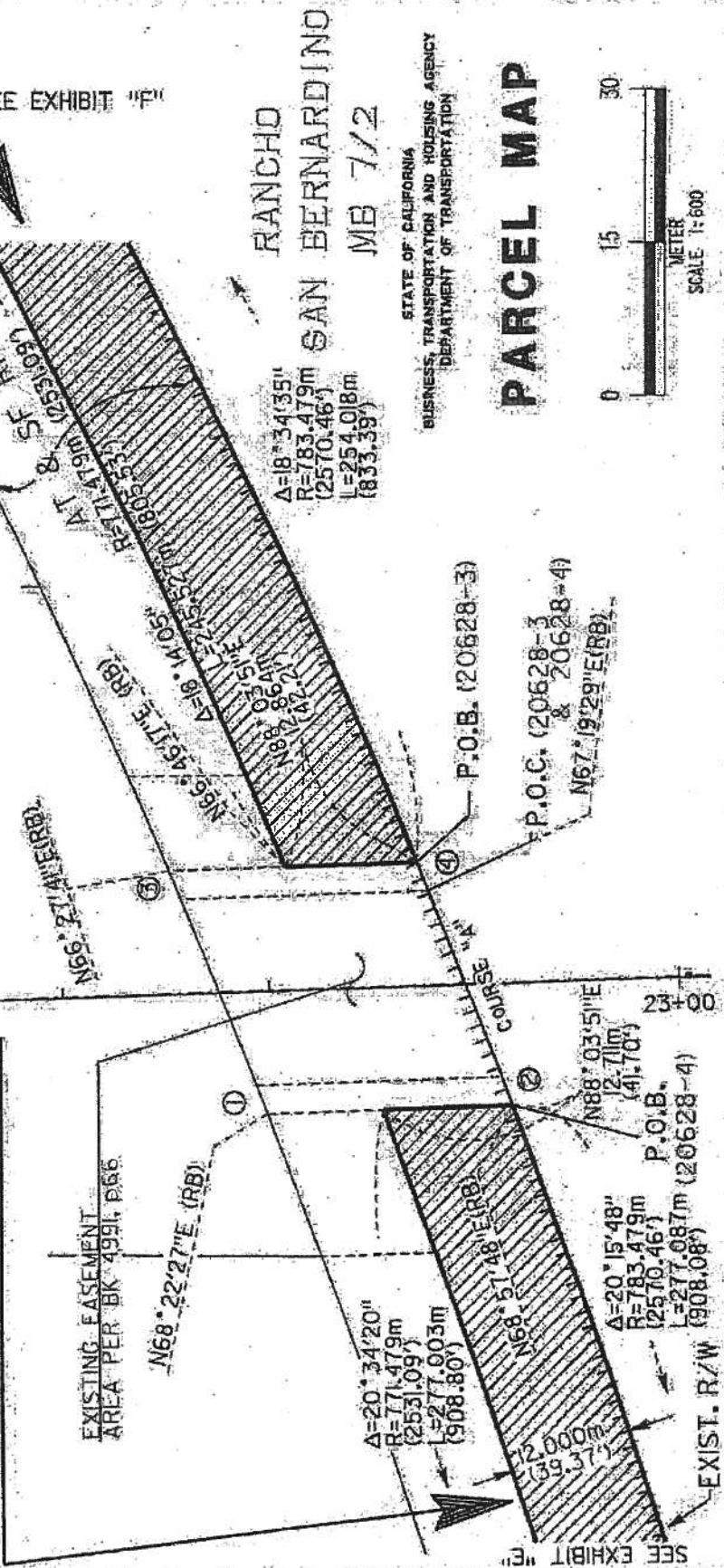
PARCEL No. 20628-3

PARCEL No. 20628-4

16TH STREET
OVERHEAD

16TH STREET
OVERHEAD

SEE EXHIBIT "E"



PARCEL MAP



DIST.	COUNTY	ROUTE	KILOMETER POST
08	SBd	215	13.82

EXHIBIT "E"



RANCHO
SAN BERNARDINO
MB 7/2

PARCEL No. 20628-4

Q MAGNOLIA AVENUE

CITY OF
(SAN BERNARDINO)

Q 1/4" STREET CONNECTOR

CONVERGENCE ANGLE - 00°25'02"
S30°25'08" EAST BRASS DISK
IN SIX SIDEWALK BASELINE
CF - 0.9999374670

SEE EXHIBIT "D"

N89°13'36"E
12.000m
(39.37')

N89°13'36"E (RB)
AT & SF RR

Q 1/4" STREET

Δ=20°34'20" R=171.479m (253.08m) Δ=21°08'11" R=183.479m (257.04m) Δ=20°15'48" R=183.479m (257.04m)

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

PARCEL MAP

Q IMP. ROUTE 215



135°00'



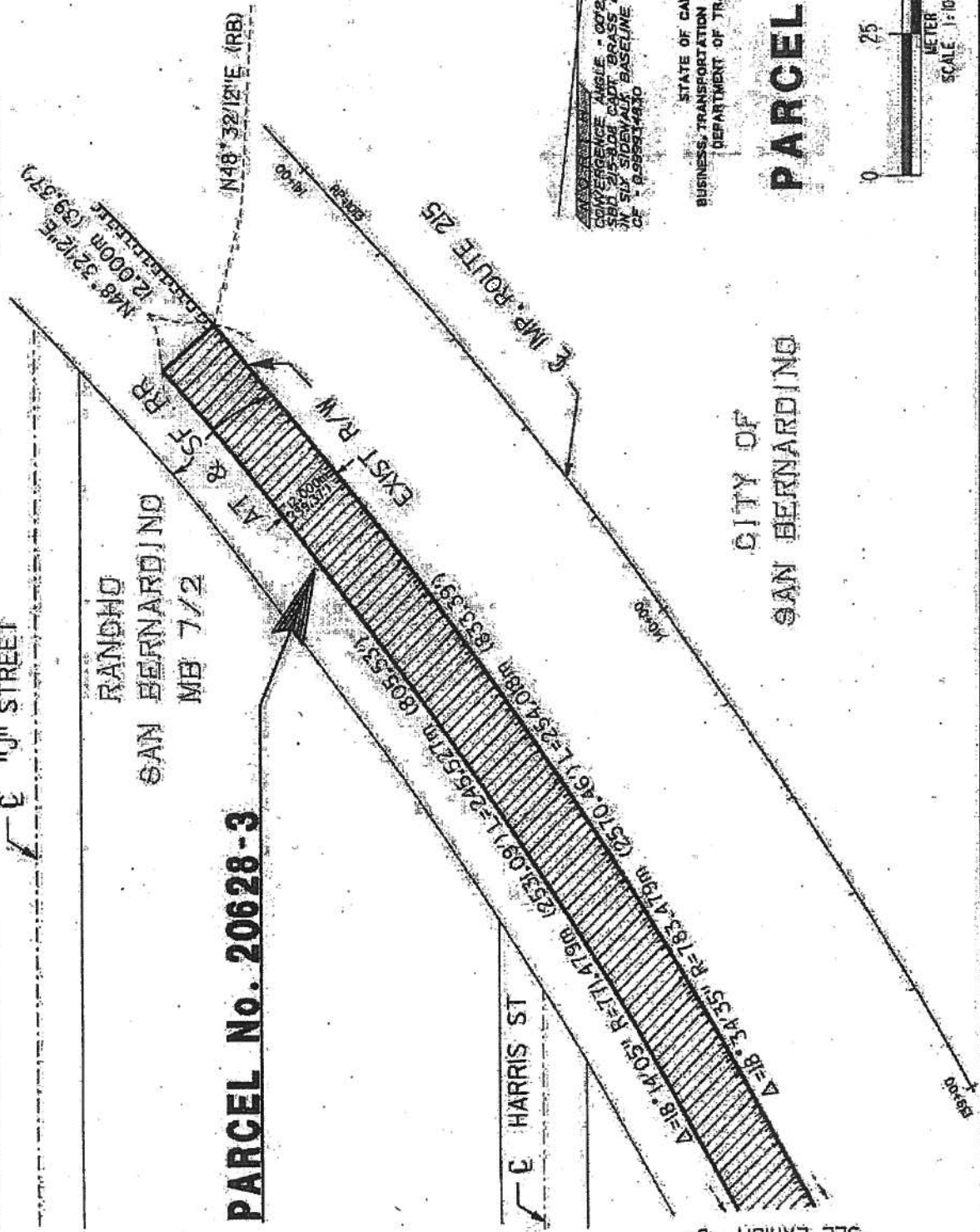
DIST.	COUNTY	ROUTE	KILOMETER POST
08	SBd	215	13.96

EXHIBIT "F"

✓ E "J" STREET

RANCHO
SAN BERNARDINO
MB 7 1/2

PARCEL No. 20628-3



✓ E HARRIS ST

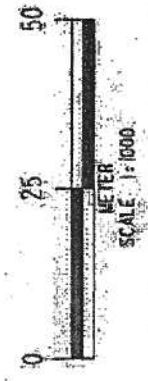
SEE EXHIBIT "D"

CONVERGENCE ANGLE - 00°21'50.2"
SBD 215 SBD CANT BRASS DISK
IN S&P SIDEWALK BASELINE
CP - 9595514430

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

PARCEL MAP

CITY OF
SAN BERNARDINO



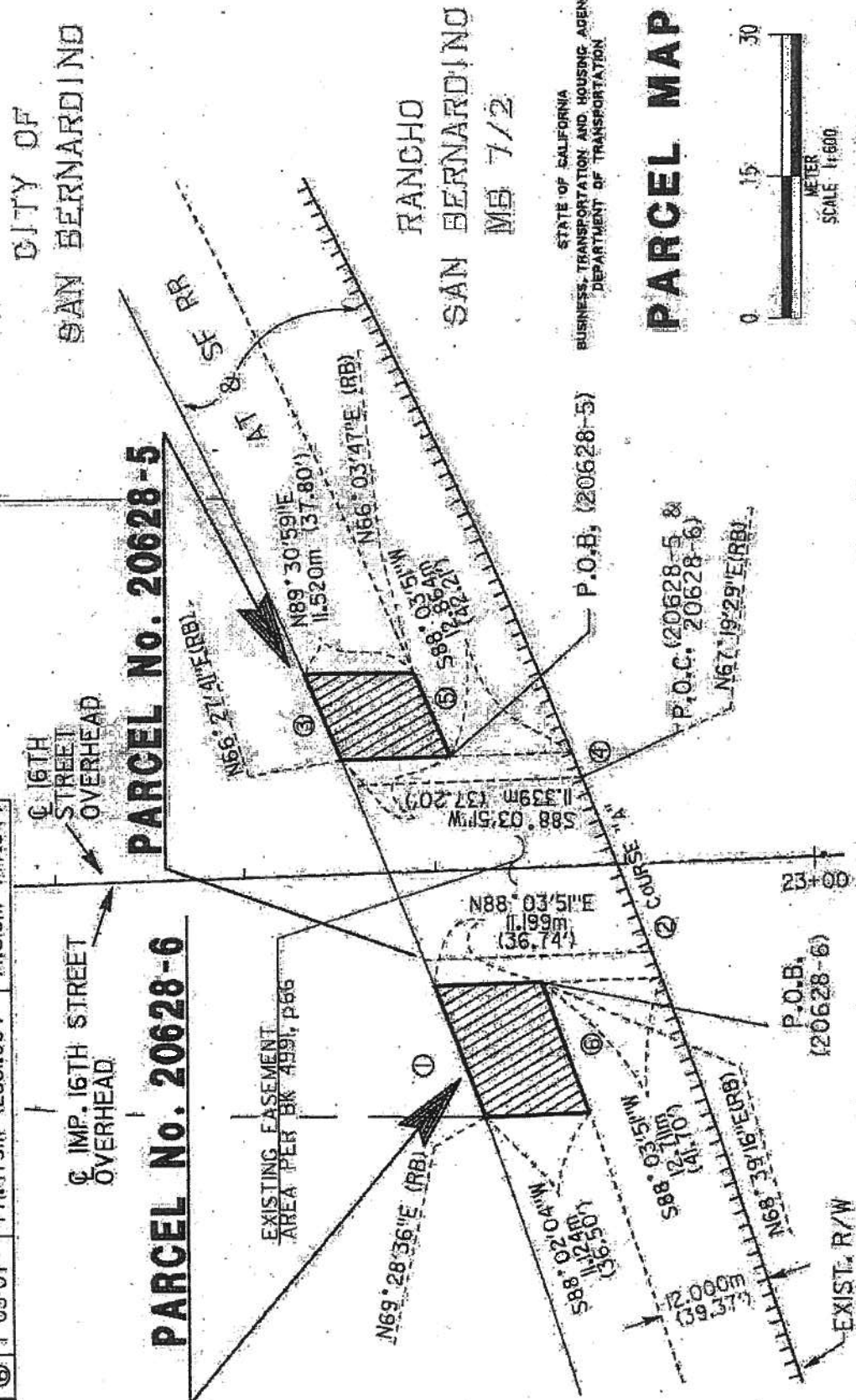


DIST.	COUNTY	ROUTE	KILOMETER POST
08	Sbd	215	13.82

EXHIBIT "G"

CURVE DATA		
NO.	Δ	LENGTH
①	1°06'09"	760.925m (2496.47')
②	1°38'19"	783.479m (2570.46')
③	0°44'37"	760.925m (2496.47')
④	0°12'42"	783.479m (2570.46')
⑤	0°42'30"	771.479m (2531.09')
⑥	1°05'07"	771.479m (2531.09')

CONVERGENCE ANGLE - 0°21'50.2"
SBD 215-108 CADD BRASS DISK
IN SIX SIDEWALK BASELINE
OF - 0.969934830



PARCEL MAP

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION



DIST.	COUNTY	ROUTE	KILOMETER POST
08	SBd	215	13.38



CURVE DATA		
NO.	Δ	LENGTH
①	0° 2' 12"	781.979m (2565.54')
②	0° 2' 12"	783.479m (2570.46')

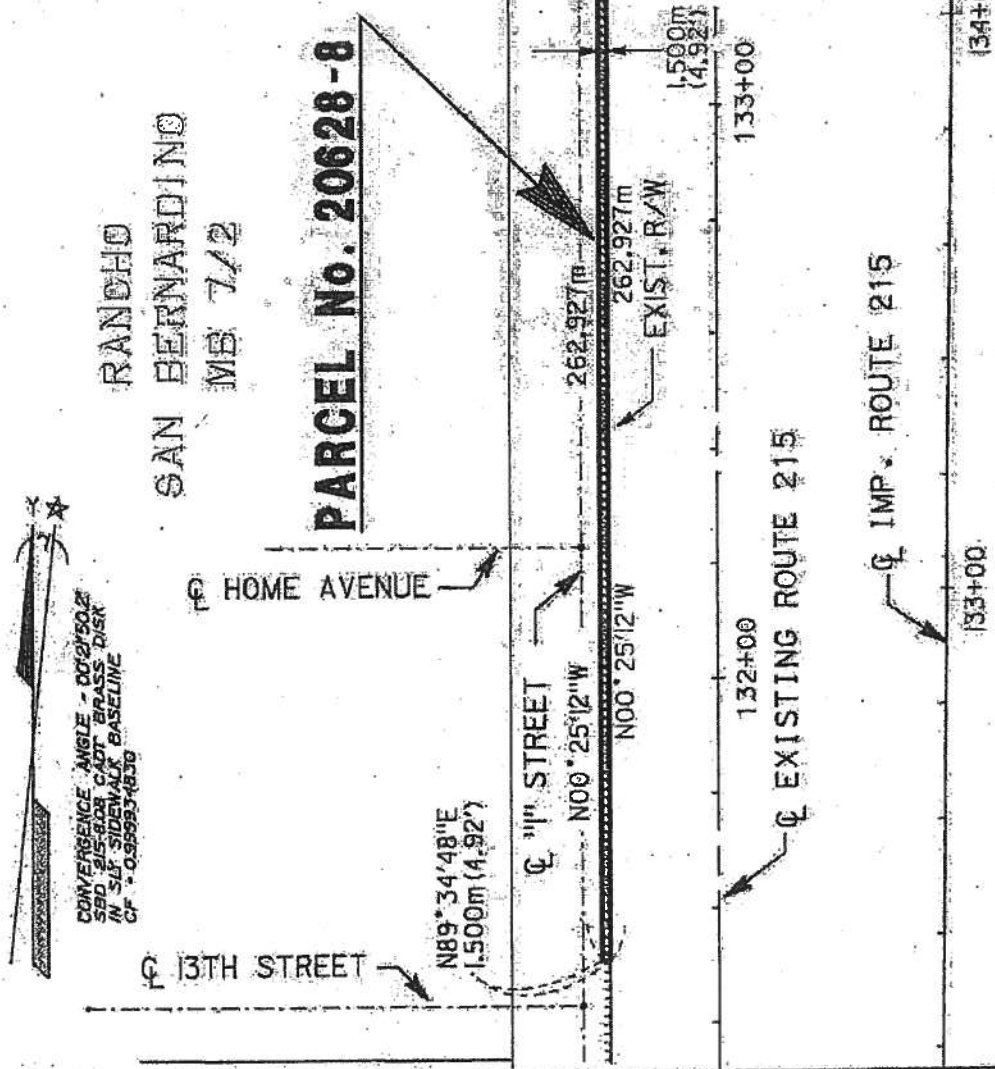
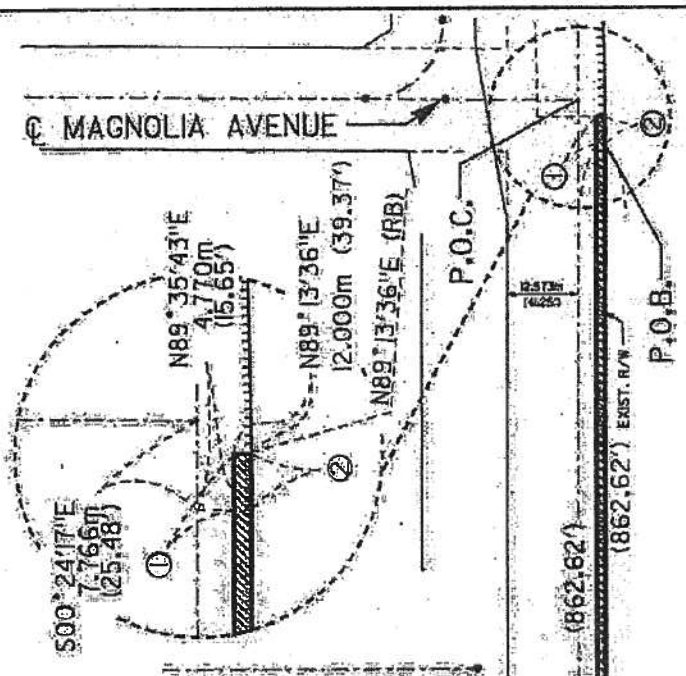
EXHIBIT "I"

CITY OF
SAN BERNARDINO

CONVERGENCE ANGLE = 00° 2' 12" E
S.D. 215-608 CADT BRASS DISK
IN S/LP SIDEWALK BASELINE
C/P = 0.39993-1830

RANCHO
SAN BERNARDINO
WB 7/2

PARCEL No. 20628-8



STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

PARCEL MAP



EXHIBIT “B-1”

EASEMENT

WHEN RECORDED MAIL TO:

Betty Bobosik, Chief
Department of Transportation
Right of Way Railroad Coordinator
Dist. 07, D-08
464 W. 4th St., 6th Floor MS-M
San Bernardino, CA 92401-1400

Recorded in Official Records,
County of San Bernardino
Doc#: 2009-0185333
4/30/2009 2:09 PM

MAIL TAX STATEMENTS TO:

SPACE ABOVE THIS LINE FOR RECORDER'S USE

DOCUMENTARY TRANSFER TAX \$ _____

...Computed on the consideration or value of Property conveyed, OR
...Computed on the consideration or value less liens or encumbrances
remaining at time of sale.

RECORDER: Please make no
charge for recording the attached instru-
ment per Govt. Code Sec. 6103. It is being
recorded in connection with a Governmental
Agency transaction _____

Signature of Declarant or Agent determining Tax - Firm Name

EASEMENT

KNOW ALL MEN BY THESE PRESENTS, that **BNSF RAILWAY COMPANY**, (formerly known as The Burlington Northern and Santa Fe Railway Company and successor by merger to The Atchison, Topeka and Santa Fe Railway Company) a Delaware corporation, whose address for purposes of this instrument is 2500 Lou Menk Drive, Fort Worth, Texas 76131-2830, Grantor, for Five Thousand three Hundred Ninety Six and No/100 Dollars **(\$5,396.00)** to it paid by **STATE OF CALIFORNIA DEPARTMENT OF TRANSPORTATION**, Grantee, and the promises of the Grantee hereinafter specified, does hereby grant unto the Grantee, subject to the terms and conditions hereinafter set forth, an **EASEMENT** for the purpose of constructing, reconstructing, removing, replacing, inspecting, repairing, maintaining and operating an overhead structure supporting columns and footings, including any and all appurtenances thereto, over, under, upon and across the described real property, together with all abutter's rights of access to and from Grantor's remaining property to the structure, and for no other purpose, located at Railroad Mile Post 79.34, Line Segment 7600, hereinafter called Structure, over, upon and across the premises, situated in the City of San Bernardino, County of San Bernardino, State of California, being more particularly described on Exhibit "A" and shown on Exhibit "B", PARCEL MAP, Parcel No. 20628-1 and 20628-2, attached hereto and by this reference made a part hereof.

ALSO, TOGETHER with the non-exclusive right of access to the easement hereinabove described by way of such roads or passageways as may now or hereafter exist on Grantor's remaining property; provided, however, that Grantee's exercise of such right of access shall not unreasonably interfere with Grantor's use of such roads or passageways, and subject to advance notification, and coordination with Grantor.

RESERVING, however, unto the Grantor, its successors and assigns, all rights in and to airspace at an elevation higher than a plane parallel with and thirty (30) feet above the roadway surface of said structure as originally constructed, and the right to construct, place, operate, maintain, alter, repair, replace, renew, improve and remove communication lines above, below and on the surface of the premises, including, without limitation, transmission by conduit, fiber optics, cable, wire or other means of electricity, voice data, video, digitized information, or other materials or information, pipelines, utility lines, track and facilities including the right of ingress and egress, in any such manner as does not unreasonably interfere with Grantee's use, enjoyment, safety and compatibility of the premises for said Structure, and further reserving unto Grantor, its successors and assigns, all right and privilege of ingress

and egress to said premises as Grantor, its successors and assigns may require to investigate and remediate environmental contamination and hazards, and further reserving the right and privilege to use said land for any and all purposes not inconsistent with the use, enjoyment, safety and compatibility thereof for said Structure.

This easement is subject and subordinate to the continuing right and obligation of Grantor, its successors and assigns, to use the area of land under the Structure in the performance of its public duty as a common carrier, and for that purpose Grantor expressly reserves for itself and its successors and assigns, the right to construct, reconstruct, maintain and operate existing or any additional railroad tracks, facilities and appurtenances thereto upon, along and across the area of land under the Structure in such manner as may be consistent with Grantee's use and enjoyment of the easement herein granted; provided, further, that in the event the area of land under the Structure is transferred to a non-transportation entity, such transferee's use of the land under the Structure shall be subject to the following limitations and conditions:

1. No use may be made of the area of land under the easement hereinabove described which would impair the full use and safety of said Structure, or would otherwise interfere with the free flow of traffic thereon or would unreasonably impair the maintenance thereof.
2. No use may be made of the area of land under said easement hereinabove described for the manufacture or storage of flammable, volatile, explosive or corrosive substances, and such substances shall not be brought onto said land except in such quantities as are normally required for the maintenance operations of occupants of said land and except as may be transported by rail or pipelines. Installation of any pipelines carrying volatile substances shall have the written approval of the Grantee as to the safety and compatibility with structure purposes and such discretion shall not be exercised in a capricious or arbitrary manner. The use of any such substances shall be in conformance with all applicable code requirements.
3. No hazardous or unreasonably objectionable smoke, fumes, vapors, dust or odors shall be permitted, which would adversely affect the use or maintenance of said Structure or the traveling public thereon.
4. No building of combustible construction shall hereafter be constructed on the area of land under the easement hereinabove described. The Grantee shall be given the opportunity to review and approve plans for any construction within said easement area 60 days prior to said construction. No buildings, no permanent structures, and no advertising displays, may be constructed within fifteen (15) feet (measured horizontally) of the sides of said structure without the express written approval of the Grantee. The Grantee shall have the discretion to determine whether such proposed construction will be inimical to or incompatible with the full enjoyment of the public rights in the Structure or against the public interest, but such discretion shall not be exercised in a capricious or arbitrary manner.

The foregoing easement is further made subject to and upon the following express conditions:

1. To existing interests in the above-described premises to whomsoever belonging and of whatsoever nature and any and all extensions and renewals thereof, including but not limited to underground pipe line or lines, or any type of wire line or lines, if any.
2. Any and all cuts and fills, excavations or embankments necessary in the construction, maintenance, or future alteration of said Structure shall be made and maintained in such manner, form and extent as will provide adequate drainage of and from the adjoining lands and premises of the Grantor; and wherever any such fill or embankment shall or may obstruct the natural and pre-existing drainage from such lands and premises of the Grantor, the Grantee shall construct and maintain such culverts or drains as may be requisite to preserve such natural and pre-existing drainage, and shall also wherever necessary, construct extensions of existing drains, culverts or ditches through or along the premises of the

Grantor, such extensions to be of adequate sectional dimensions to preserve the present flowage of drainage or other waters, and of materials and workmanship equally as good as those now existing.

3. The Grantee shall bear the cost of removal, relocation or reconstruction of any and all right of way fences, telephone or telegraph poles, or other facilities, the removal, relocation or reconstruction of which may be made necessary by reason of the use of said premises for said Structure purposes.
4. The Grantee shall, at its own cost and expense, make adjustment with industries or other lessees of Grantor for buildings or improvements that may have to be relocated, reconstructed or destroyed by reason of the construction and maintenance of said Structure on said premises.
5.
 - a. If during the construction or subsequent maintenance of said Structure, soils or other materials considered to be environmentally contaminated are exposed within the easement area, Grantee will promptly notify Grantor and will remove to the depth and width necessary to fully remediate said exposure and safely dispose of said contaminated soils and/or materials. If requested by Grantor, such soil shall be replaced with clean fill. Grantee shall indemnify, protect and defend the Grantor from any and all liability, claims or demands, if any, which arise as a result of exposure and/or removal of said contaminated soils or materials by Grantee. Liability for the management and removal of existing contaminated soils or materials, if any, within the easement area that are not disturbed by Grantee's construction or maintenance of its project, other than those soils necessary to fully remediate any disturbance caused by such construction or maintenance, shall remain the sole responsibility of the Grantor. Determination of soils contamination and applicable disposal procedures thereof, will be made only by an agency having the capacity and authority to make such a determination.
 - b. In the event that excavated soil or material is to be removed and transported off-site, Grantee shall, prior to any removal and/or transport, present for Engineer's review, an acceptable environmental management plan ("EMP"). Grantee must obtain written consent from Engineer prior to removal and/or transportation of Excavated Material. Such consent shall not constitute approval of the chosen removal or transportation methodology, or whether the EMP complies with any or all local, state, federal or engineering standards.
6. Grantor and Grantee have entered into that certain Overhead Agreement dated as of MARCH 4, 2009 concerning the Premises (the "Overhead Agreement"). The terms of the Overhead Agreement, as may be amended from time to time, are incorporated herein as if fully set forth in this instrument which terms shall be in full force and effect for purposes of this Easement even if the Overhead Agreement is, for whatever reason, no longer in effect.
7. Grantee shall pay when due any taxes, assessments or other charges (collectively, "Taxes") levied or assessed upon the Improvements by any governmental or quasi-governmental body or any Taxes levied or assessed against Grantor or the Premises that are attributable to the Improvements. Grantee agrees to purchase, affix and cancel any and all documentary stamps in the amount prescribed by statute, and to pay any and all required transfer taxes, excise taxes and any and all fees incidental to recordation of the Easement. In the event of Grantee's failure to do so, if Grantor shall become obligated to do so, Grantee shall be liable for all costs, expenses and judgments to or against Grantor, including all of Grantor's legal fees and expenses.
8. The Grantee or its contractor(s) shall telephone Grantor's Communication Network Control Center at **(800) 533-2891** (a 24 hour number) to determine if fiber optic cable is buried anywhere on the premises; and if so, the Grantee or its contractor(s) will contact the Telecommunications Company(ies) involved, and make arrangements with the Telecommunications Company(ies) for protection of the fiber optic cable prior to beginning any work on the premises.

9. If said described premises, or any part thereof, shall at any time voluntarily cease to be used by said Grantee, or by the public, for the purpose, as aforesaid for a period of two (2) consecutive years, or should they be converted to any other use whatsoever, or should the Grantee fail to perform any of the conditions herein expressed after notice and a reasonable opportunity to cure, then upon written request by the Grantor, Grantee shall immediately request abandonment in accordance with the applicable statutes or laws of the State of California, and, subject to appropriations being made for the purpose by the California Transportation Commission, Grantee shall, remove said structure and restore Railroad's premises to the condition existing prior to construction of said structure.
10. The Grantor does not warrant its title to said premises nor undertake to defend the Grantee in the peaceable possession, use or enjoyment thereof; and the grant herein made is subject to all outstanding rights or interest of others, including the tenants and licensees of the Grantor.
11. This easement shall be binding upon and inure to the benefit of the heirs, executors, administrators, assigns and successors of Grantor and Grantee.

TO HAVE AND TO HOLD THE SAME, together with all the hereditaments and appurtenances thereunto belonging to Grantee for public use and enjoyment for the purposes aforesaid and for no other purpose whatsoever subject to the terms and conditions hereinbefore stated.

The Grantor, for itself, its successors and assigns, hereby waives any claim for any and all damages to grantor's remaining property contiguous to the right of way hereby conveyed by reason of the location, construction or maintenance of said highway.

IN WITNESS WHEREOF, the said **BNSF RAILWAY COMPANY** has caused this instrument to be signed by its authorized officer, and the corporate seal affixed on the 24th day of APRIL, 2008.



BNSF RAILWAY COMPANY

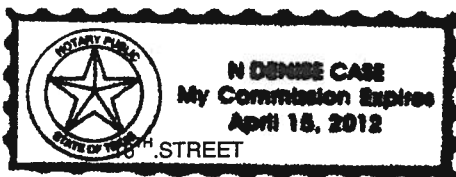
By: David P. Schneider
David P. Schneider
General Director-
Land Revenue Management

ATTEST:

By: Patricia Zbichorski
Patricia Zbichorski
Assistant Secretary

STATE OF TEXAS)
) ss.
COUNTY OF TARRANT)

On this 24th day of APRIL, 2008, before me, the undersigned, a Notary Public in and for said County and State, personally appeared David P. Schneider and Patricia Zbichorski, known to me to be General Director-Land Revenue Management and Assistant Secretary, respectively, of the corporation that executed the within instrument on behalf of the Corporation therein named, and acknowledged to me that such Corporation executed the same.



Denise Case
Notary's Signature

My Commission Expires: April 15, 2012

THIS IS TO CERTIFY, That the State of California, acting by and through the Department of Transportation (pursuant to Government Code Section 27281), hereby accepts for public purposes the real property described in the within deed and consents to the Recording thereof.

IN WITNESS WHEREOF, I have hereunto set my hand this day of , 2008



Director of Transportation

FORM APPROVED BY LAW

EXHIBIT "A"

08-SBd-215-13.82 (KP)
#20628-1

Parcel 20628-1

An easement for freeway purposes, over, under, upon and across those portions of Lot 3, Block 53, in the City of San Bernardino, County of San Bernardino, State of California, as shown by the Map of the Survey of San Bernardino Rancho, filed in Book 7, page 2, County Recorder of said County, a portion being described in Director's Deeds to the Atchison, Topeka and Santa Fe Railroad Company, recorded November 25, 1959 in Book 4991, pages 66 Official records of said County, more particularly described as follows:

BEGINNING at the northwesterly terminus of Course "A" as described in said deed, said terminus being a point on the northeast side of the access controlled railroad right of way common with State Route 215, also being on a non-tangent curve concave southwesterly having a radius of 783.479 meters (2570.46 feet), a radial line bears North 67°19'29" East; thence northerly along said curve through a central angle of 00°12'42" an arc distance of 2.895 meters (9.50 feet); thence South 88°03'51" West, 24.203 meters (79.41 feet) to the westerly line of said deed and the beginning of a non-tangent curve concave westerly having a radius of 760.925 meters (2496.47 feet), a radial line bears North 66°27'41" East; thence southerly along said west line and said curve concentric with and distant 12 meters from the easterly Railroad right of way through a central angle of 00°13'12" an arc distance of 2.921 meters (9.58 feet), to the north line of a reserved easement to the State of California for right of way of a highway overpass in said deed; thence along said north line, North 88°02'02" East, 24.163 meters (79.28 feet) to the **POINT OF BEGINNING**.

08-SBd-215-13.82 (KP)
#20628-2

Parcel 20628-2

An easement for freeway purposes, over, under, upon and across those portions of Lot 3, Block 53, in the City of San Bernardino, County of San Bernardino, State of California, as shown by the Map of the Survey of San Bernardino Rancho, filed in Book 7, page 2, County Recorder of said County, a portion being described in Director's Deeds to the Atchison, Topeka and Santa Fe Railroad Company, recorded November 25, 1959 in Book 4991, pages 66 Official records of said County, more particularly described as follows:

COMMENCING at the northwesterly terminus of Course "A" as described in said deed, said terminus being a point on the northeast side of the access controlled Railroad right of way common with State Route 215, also being on a non-tangent curve concave southwesterly having a radius of 783.479 meters

(2570.46 feet), a radial line bears North 67°19'29" East; thence southerly along said Course "A" and said curve through a central angle of 1°38'19" an arc distance of 22.407 meters (73.51 feet) to the **POINT OF BEGINNING**; thence South 88°03'51" West, 23.910 meters (78.45 feet) to the west line of said Railroad right of way and of said deed and the beginning of a non-tangent curve concave westerly having a radius of 760.925 meters (2496.47 feet), a radial line bears North 68°22'27" East; thence northerly along said west line and said curve through a central angle of 00°13'17" an arc distance of 2.941 meters (9.65 feet) to the south line of a reserved easement to the State of California for right of way of a highway overpass in said deed; thence along said south line, North 88°02'02" East, 23.938 meters (78.54 feet) to a point on first said non-tangent curve concave southwesterly having a radius of 783.479 meters (2570.46 feet), a radial line bears North 68°44'53" East; thence southerly along first said non-tangent curve through a central angle of 00°12'55" an arc distance of 2.943 meters (9.66 feet) to the **POINT OF BEGINNING**.

The bearings and distances used in the above descriptions of parcels 20628-1 and 20628-2 are based on the California Coordinate System of 1983, Zone 5. Multiply distances shown by 1.000068345 to obtain ground level distances.

These real property descriptions have been prepared by me, or under my direction, in conformance with the Professional Land Surveyors Act.

Signature: _____

Professional Land Surveyor

Date: _____

Nov. 25, 2008





DIST.	COUNTY	ROUTE	KILOMETER POST
08	SBd.	215	13.67-13.96

EXHIBIT "B"

SHEET 1 OF 2

PARCEL No. 8 20628-1 & 20628-2

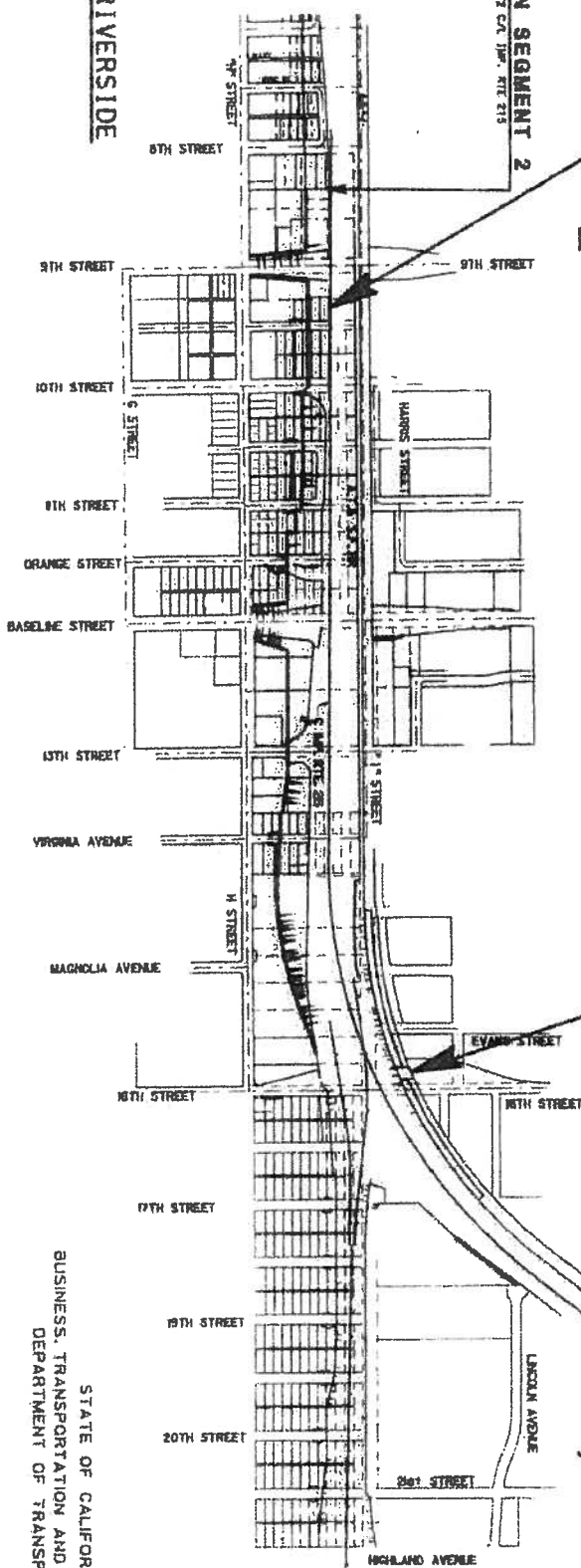
Q IMP. RTE. 215

BEGIN SEGMENT 2
122+52.87E C/L IMP. RTE 215

END SEGMENT 2
13+18.58E C/L IMP. RTE 215

TO VICTORVILLE

TO RIVERSIDE



CITY OF
SAN BERNARDINO

RANCHO SAN BERNARDINO
M.S. 7 / 2

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

**PARCEL
INDEX MAP**

NO SCALE

CURVE DATA		
NO.	RADIUS	LENGTH
①	0°13'17" 760.925m (2496.47')	2.941m (9.65')
②	0°12'55" 783.479m (2570.46')	2.943m (9.66')
③	0°13'12" 760.925m (2496.47')	2.921m (9.58')
④	0°12'42" 783.479m (2570.46')	2.895m (9.50')



DIST.	COUNTY	ROUTE	KILOMETER POST
08	SBD	215	13.82

EXHIBIT "B"

SHEET 2 OF 2

CITY OF SAN BERNARDINO

CONVERGENCE ANGLE - 00°15'02"
SBD 215-B08 CADT BRASS DISK
IN SLY SIDEWALK BASELINE
C# - 0999934830

BLOCK A

IMP. 16TH STREET
OVERHEAD

16TH STREET
OVERHEAD

PARCEL No. 20628-2
EASEMENT

EXISTING EASEMENT
AREA PER BK 4991, P66

N68°22'27"E (RB)

N88°03'51"E
23.910m
(78.45')

N88°02'02"E
23.938m (78.54')

N88°02'02"E
24.163m (79.28')

N66°21'41"E (RB)
N88°03'51"E
24.203m
(79.41')

AT & SF RR

N68°51'48"E (RB)

EXIST. R/W

P.O.B.
(20628-2)

COURSE

P.O.B. (20628-1)
P.O.C. (20628-2)

N67°19'29"E (RB)

PARCEL No. 20628-1
EASEMENT

RANCHO
SAN BERNARDINO
WB 7/2

STATE OF CALIFORNIA
BUSINESS, TRANSPORTATION AND HOUSING AGENCY
DEPARTMENT OF TRANSPORTATION

PARCEL MAP



EXHIBIT "C"
CONTRACTOR REQUIREMENTS
16th. STREET OVERHEAD

1.01 General

- **1.01.01** The Contractor must cooperate with **BNSF RAILWAY COMPANY**, hereinafter referred to as "Railway" where work is over or under on or adjacent to Railway property and/or right-of-way, hereafter referred to as "Railway Property", during the demolition and reconstruction of the 16th. Street Overhead.
- **1.01.02** The Contractor must execute and deliver to the Railway duplicate copies of the Exhibit "C-1" Agreement, in the form attached hereto, obligating the Contractor to provide and maintain in full force and effect the insurance called for under Section 3 of said Exhibit "C-1". Questions regarding procurement of the Railroad Protective Liability Insurance should be directed to Rosa Martinez at Marsh, USA, 214-303-8519.
- **1.01.03** The Contractor must plan, schedule and conduct all work activities so as not to interfere with the movement of any trains on Railway Property.

1.01.04 The Contractor's right to enter Railway's Property is subject to the absolute right of Railway to cause the Contractor's work on Railway's Property to cease if, in the opinion of Railway, Contractor's activities create a hazard to Railway's Property, employees, and/or operations. Railway will have the right to stop construction work on the Project if any of the following events take place: (i) Contractor (or any of its subcontractors) performs the Project work in a manner contrary to the plans and specifications approved by Railway; (ii) Contractor (or any of its subcontractors), in Railway's opinion, prosecutes the Project work in a manner which is hazardous to Railway property, facilities or the safe and expeditious movement of railroad traffic; (iii) the insurance described in the attached Exhibit C-1 is canceled during the course of the Project; or (iv) STATE OF CALIFORNIA fails to pay Railway for the Temporary Construction License or the Easement pursuant to Article II, Section 1 of this Agreement. The work stoppage will continue until all necessary actions are taken by Contractor or its subcontractor to rectify the situation to the satisfaction of Railway's Division Engineer or until additional insurance has been delivered to and accepted by Railway. In the event of a breach of (i) this Agreement, (ii) the Temporary Construction License, or (iii) the Easement, Railway may immediately terminate the Temporary Construction License or the Easement. Any such work stoppage under this provision will not give rise to any liability on the part of Railway. Railway's right to stop the work is in addition to any other rights Railway may have including, but not limited to, actions or suits for damages or lost profits. In the event that Railway desires to stop construction work on the Project, Railway agrees to immediately notify the following individual in writing:

SANBAG Director of Freeway Construction
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410
Fax: (909) 388-2002.

- **1.01.05** The Contractor is responsible for determining and complying with all Federal, State and Local Governmental laws and regulations, including, but not limited to environmental laws and regulations (including but not limited to the Resource Conservation and Recovery Act, as amended; the Clean Water Act, the Oil Pollution Act, the Hazardous Materials Transportation Act, CERCLA), and health and safety laws and regulations. The Contractor hereby indemnifies, defends and holds harmless Railway for, from and against all fines or penalties imposed or assessed by Federal, State and Local Governmental Agencies against the Railway which arise out of Contractor's work under this Agreement.
- **1.01.06** The Contractor must notify the Director of Freeway Construction, **SAN BERNARDINO ASSOCIATED GOVERNMENTS**, hereinafter referred to as ("**SANBAG**") at 1170 W. 3rd Street, 2nd. Floor, San Bernardino, CA. 92410, Fax No. (909) 388 2002 and Railway's Manager Public Projects, telephone number (909)-386-4472, at least thirty (30) calendar days before commencing any work on Railway Property. Contractor's notification to Railway, must refer to Railroad's file No. 026110K.

- **1.01.07** . For any bridge demolition and/or falsework above any tracks or any excavations located with any part of the excavations located within, whichever is greater, twenty-five (25) feet of the nearest track or intersecting a slope from the plane of the top of rail on a 2 horizontal to 1 vertical slope beginning at eleven (11) feet from centerline of the nearest track, both measured perpendicular to center line of track, the Contractor must furnish the Railway five sets of working drawings showing details of construction affecting Railway Property and tracks. The working drawing must include the proposed method of installation and removal of falsework, shoring or cribbing, not included in the contract plans and two sets of structural calculations of any falsework, shoring or cribbing. For all excavation and shoring submittal plans, the current "BNSF-UPRR Guidelines for Temporary Shoring" must be used for determining the design loading conditions to be used in shoring design, and all calculations and submittals must be in accordance with the current "BNSF-UPRR Guidelines for Temporary Shoring". All submittal drawings and calculations must be stamped by a registered professional engineer licensed to practice in the state the project is located. All calculations must take into consideration railway surcharge loading and must be designed to meet American Railway Engineering and Maintenance-of-Way Association (previously known as American Railway Engineering Association) Coopers E-80 live loading standard. All drawings and calculations must be stamped by a registered professional engineer licensed to practice in the state the project is located. The Contractor must not begin work until notified by the Railway that plans have been approved. The Contractor will be required to use lifting devices such as, cranes and/or winches to place or to remove any falsework over Railway's tracks. In no case will the Contractor be relieved of responsibility for results obtained by the implementation of said approved plans.
- **1.01.08** Subject to the movement of Railway's trains, Railway will cooperate with the Contractor such that the work may be handled and performed in an efficient manner. The Contractor will have no claim whatsoever for any type of damages or for extra or additional compensation in the event his work is delayed by the Railway.

1.02 Contractor Safety Orientation

- **1.02.01** No employee of the Contractor, its subcontractors, agents or invitees may enter Railway Property without first having completed Railway's Engineering Contractor Safety Orientation, found on the web site www.contractororientation.com. The Contractor must ensure that each of its employees, subcontractors, agents or invitees completes Railway's Engineering Contractor Safety Orientation through internet sessions before any work is performed on the Project. Additionally, the Contractor must ensure that each and every one of its employees, subcontractors, agents or invitees possesses a card certifying completion of the Railway Contractor Safety Orientation before entering Railway Property. The Contractor is responsible for the cost of the Railway Contractor Safety Orientation. The Contractor must renew the Railway Contractor Safety Orientation annually. Further clarification can be found on the web site or from the Railway's Representative.

1.03 Railway Requirements

- **1.03.01** The Contractor must take protective measures as are necessary to keep railway facilities, including track ballast, free of sand, debris, and other foreign objects and materials resulting from his operations. Any damage to railway facilities resulting from Contractor's operations will be repaired or replaced by Railway and the cost of such repairs or replacement must be paid for by SANBAG.
- **1.03.02** Blasting shall not be allowed on or adjacent to Railway property and/or right of way unless approved by the Railway.
- **1.03.03** The Contractor must abide by the following temporary clearances during construction:
 - 10'-0" Horizontally from centerline of nearest track
 - 21'-6" Vertically above top of rail
 - 27'-0" Vertically above top of rail for electric wires carrying less than 750 volts
 - 28'-0" Vertically above top of rail for electric wires carrying 750 volts to 15,000 volts
 - 30'-0" Vertically above top of rail for electric wires carrying 15,000 volts to 20,000 volts
 - 34'-0" Vertically above top of rail for electric wires carrying more than 20,000 volts

- **1.03.04** Upon completion of construction, the following clearances shall be maintained:
 - 16'-0" Horizontal from centerline of nearest track
 - 29'-3" Vertically above top of rail
- **1.03.05** Any infringement within State statutory clearances due to the Contractor's operations must be submitted to the Railway and to SANBAG and must not be undertaken until approved in writing by the Railway, and until SANBAG has obtained any necessary authorization from the State Regulatory Authority for the infringement. No extra compensation will be allowed in the event the Contractor's work is delayed pending Railway approval, and/or the State Regulatory Authority's approval.
- **1.03.06** In the case of impaired vertical clearance above top of rail, Railway will have the option of installing tell-tales or other protective devices Railway deems necessary for protection of Railway operations. The cost of tell-tales or protective devices will be borne by SANBAG.
- **1.03.07** The details of construction affecting the Railway's Property and tracks not included in the contract plans must be submitted to the Railway by SANBAG for approval before work is undertaken and this work must not be undertaken until approved by the Railway.
- **1.03.08** At other than public road crossings, the Contractor must not move any equipment or materials across Railway's tracks until permission has been obtained from the Railway. The Contractor must obtain a "Temporary Construction Crossing Agreement" from the Railway prior to moving his equipment or materials across the Railways tracks. The temporary crossing must be gated and locked at all times when not required for use by the Contractor. The temporary crossing for use of the Contractor will be constructed and at the completion of the project, removed at the expense of the Contractor.
- **1.03.09** Discharge, release or spill on the Railway Property of any hazardous substances, oil, petroleum, constituents, pollutants, contaminants, or any hazardous waste is prohibited and Contractor must immediately notify the Railway's Resource Operations Center at 1(800) 832-5452, of any discharge, release or spills in excess of a reportable quantity. Contractor must not allow Railway Property to become a treatment, storage or transfer facility as those terms are defined in the Resource Conservation and Recovery Act or any state analogue.
- **1.03.10** The Contractor upon completion of the work covered by this contract, must promptly remove from the Railway's Property all of Contractor's tools, equipment, implements and other materials, whether brought upon said property by said Contractor or any Subcontractor, employee or agent of Contractor or of any Subcontractor, and must cause Railway's Property to be left in a condition acceptable to the Railway's representative.

1.04 Contractor Roadway Worker on Track Safety Program and Safety Action Plan

- **1.04.01** Each Contractor that will perform work within 25 feet of the centerline of a track must develop and implement a Roadway Worker Protection/On Track Safety Program and work with Railway Project Representative to develop an on track safety strategy as described in the guidelines listed in the on track safety portion of the Safety Orientation. This Program must provide Roadway Worker protection/on track training for all employees of the Contractor, its subcontractors, agents or invitees. This training is reinforced at the job site through job safety briefings. Additionally, each Contractor must develop and implement the Safety Action Plan, as provided for on the web site www.contractororientation.com, which will be made available to Railway prior to commencement of any work on Railway Property. During the performance of work, the Contractor must audit its work activities. The Contractor must designate an on-site Project Supervisor who will serve as the contact person for the Railway and who will maintain a copy of the Safety Action Plan, safety audits, and Material Safety Datasheets (MSDS), at the job site.
- **1.04.02** Contractor shall have a background investigation performed on all of its employees, subcontractors and agents who will be performing any services on railroad property under this Agreement.

The background screening shall at a minimum meet the criteria defined by the e-RAILSAFE program outlined at <http://www.e-railsafe.com> in addition to any other applicable regulatory requirements. The e-RAILSAFE program uses rail industry background screening standards.

Contractor shall obtain consent from all employees screened in compliance with the e-RAILSAFE program criteria to release completed background information to BNSF. Contractor shall be subject to periodic audit to ensure compliance.

Contractor shall not permit any of its employees, subcontractors or agents to perform services on property hereunder who are not approved under e-RAILSAFE program standards. Railroad shall have the right to deny entry onto its premises to any of Contractor's employees, subcontractors or agents who do not display the authorized identification badge issued by a background screening service meeting the standards set forth for the e-RAILSAFE program or who pose a threat, in Railroad's reasonable opinion, to the safety or security of Railroad's operations.

Contractors shall ensure its employees, subcontractors and agents are United States citizens or legally working in this country under a work VISA.

1.05 Facilities and Railway Flagger Services:

- **1.05.01** The Contractor must give Railway's Roadmaster (telephone 909 386 4061) a minimum of thirty (30) calendar days advance notice when flagging services will be required so that the Roadmaster can make appropriate arrangements (i.e., bulletin the flagger's position). If flagging services are scheduled in advance by the Contractor and it is subsequently determined by the parties hereto that such services are no longer necessary, the Contractor must give the Roadmaster five (5) working days advance notice so that appropriate arrangements can be made to abolish the position pursuant to union requirements.
- **1.05.02** Unless determined otherwise by Railway's Project Representative, Railway flagger will be required and furnished when Contractor's work activities are located over, under and/or within twenty-five (25) feet measured horizontally from centerline of the nearest track and when cranes or similar equipment positioned beyond 25-feet from the track centerline could foul the track in the event of tip over or other catastrophic occurrence, but not limited thereto for the following conditions:

1.05.02a When upon inspection by Railway's Representative, other conditions warrant.

- **1.05.02b** When any excavation is performed below the bottom of tie elevation, if, in the opinion of Railway's representative, track or other Railway facilities may be subject to movement or settlement.
- **1.05.02c** When work in any way interferes with the safe operation of trains at timetable speeds.
- **1.05.02d** When any hazard is presented to Railway track, communications, signal, electrical, or other facilities either due to persons, material, equipment or blasting in the vicinity.
- **1.05.02e** Special permission must be obtained from the Railway before moving heavy or cumbersome objects or equipment which might result in making the track impassable.
- **1.05.03** Flagging services will be performed by qualified Railway flaggers.
- **1.05.03a** Flagging crew generally consists of one employee. However, additional personnel may be required to protect Railway Property and operations, if deemed necessary by the Railways Representative.
- **1.05.03b** Each time a flagger is called, the minimum period for billing will be the eight (8) hour basic day.
- **1.05.03c** The cost of flagger services provided by the Railway will be borne by SANBAG. The estimated cost for one (1) flagger is approximately between \$800.00 - \$1600.00 for an eight (8) hour basic day with time and one-half or double time for overtime, rest days and holidays. The estimated cost for each flagger includes vacation allowance, paid holidays, Railway and unemployment insurance, public liability and property damage insurance, health and welfare benefits, vehicle transportation, meals, lodging, radio equipment, supervision and

other costs incidental to performing flagging services. Negotiations for Railway labor or collective bargaining agreements and rate changes authorized by appropriate Federal authorities may increase actual or estimated flagging rates. The flagging rate in effect at the time of performance by the Contractor hereunder will be used to calculate the actual costs of flagging pursuant to this paragraph.

- **1.05.03d** The average train traffic on this route is 79 freight trains and 2 passenger trains per 24-hour period. Train timetable speeds are:

Westward: 50 MPH Passenger, 35 MPH Freight

Eastward: 60 MPH Passenger, 55 MPH Freight

1.06 Contractor General Safety Requirements

- **1.06.01** Work in the proximity of railway track(s) is potentially hazardous where movement of trains and equipment can occur at any time and in any direction. All work performed by contractors within 25 feet of any track must be in compliance with FRA Roadway Worker Protection Regulations.
- **1.06.02** Before beginning any task on Railway Property, a thorough job safety briefing must be conducted with all personnel involved with the task and repeated when the personnel or task changes. If the task is within 25 feet of any track, the job briefing must include the Railway's flagger, as applicable, and include the procedures the Contractor will use to protect its employees, subcontractors, agents or invitees from moving any equipment adjacent to or across any Railway track(s).
- **1.06.03** Workers must not work within 25 feet of the centerline of any track without an on track safety strategy approved by the Railway's Project Representative. When authority is provided, every contractor employee must know: (1) who the Railway flagger is, and how to contact the flagger, (2) limits of the authority, (3) the method of communication to stop and resume work, and (4) location of the designated places of safety. Persons or equipment entering flag/work limits that were not previously job briefed, must notify the flagger immediately, and be given a job briefing when working within 25 feet of the center line of track.
- **1.06.04** When Contractor employees are required to work on the Railway Property after normal working hours or on weekends, the Railroad's representative in charge of the project must be notified. A minimum of two employees must be present at all times.
- **1.06.05** Any employees, agents or invitees of Contractor or its subcontractors under suspicion of being under the influence of drugs or alcohol, or in the possession of same, will be removed from the Railway's Property and subsequently released to the custody of a representative of Contractor management. Future access to the Railway's Property by that employee will be denied.
- **1.06.06** Any damage to Railway Property, or any hazard noticed on passing trains must be reported immediately to the Railway's representative in charge of the project. Any vehicle or machine which may come in contact with track, signal equipment, or structure (bridge) and could result in a train derailment must be reported immediately to the Railway representative in charge of the project and to the Railway's Resource Operations Center at 1(800) 832-5452. Local emergency numbers are to be obtained from the Railway representative in charge of the project prior to the start of any work and must be posted at the job site.
- **1.06.07** For safety reasons, all persons are prohibited from having pocket knives, firearms or other deadly weapons in their possession while working on Railway's Property.
- **1.06.08** All personnel protective equipment (PPE) used on Railway Property must meet applicable OSHA and ANSI specifications. Current Railway personnel protective equipment requirements are listed on the web site, www.contractororientation.com, however, a partial list of the requirements include: a) safety glasses with permanently affixed side shields (no yellow lenses); b) hard hats c) safety shoe with: hardened toes, above-the-ankle lace-up and a defined heel; and d) high visibility retro-reflective work wear. The Railroad's representative in charge of the project is to be contacted regarding local specifications for meeting requirements relating to hi-visibility work wear. Hearing protection, fall protection, gloves, and respirators must be worn as

required by State and Federal regulations. **(NOTE – Should there be a discrepancy between the information contained on the web site and the information in this paragraph, the web site will govern.)**

- **1.06.09 THE CONTRACTOR MUST NOT PILE OR STORE ANY MATERIALS, MACHINERY OR EQUIPMENT CLOSER THAN 25'-0" TO THE CENTER LINE OF THE NEAREST RAILWAY TRACK. MATERIALS, MACHINERY OR EQUIPMENT MUST NOT BE STORED OR LEFT WITHIN 250 FEET OF ANY HIGHWAY/RAIL AT-GRADE CROSSINGS OR TEMPORARY CONSTRUCTION CROSSING, WHERE STORAGE OF THE SAME WILL OBSTRUCT THE VIEW OF A TRAIN APPROACHING THE CROSSING. PRIOR TO BEGINNING WORK, THE CONTRACTOR MUST ESTABLISH A STORAGE AREA WITH CONCURRENCE OF THE RAILROAD'S REPRESENTATIVE.**
- **1.06.10** Machines or vehicles must not be left unattended with the engine running. Parked machines or equipment must be in gear with brakes set and if equipped with blade, pan or bucket, they must be lowered to the ground. All machinery and equipment left unattended on Railway's Property must be left inoperable and secured against movement. (See internet Engineering Contractor Safety Orientation program for more detailed specifications)
- **1.06.11** Workers must not create and leave any conditions at the work site that would interfere with water drainage. Any work performed over water must meet all Federal, State and Local regulations.
- **1.06.12** All power line wires must be considered dangerous and of high voltage unless informed to the contrary by proper authority. For all power lines the minimum clearance between the lines and any part of the equipment or load must be; 200 KV or below - 15 feet; 200 to 350 KV - 20 feet; 350 to 500 KV - 25 feet; 500 to 750 KV - 35 feet; and 750 to 1000 KV - 45 feet. If capacity of the line is not known, a minimum clearance of 45 feet must be maintained. A person must be designated to observe clearance of the equipment and give a timely warning for all operations where it is difficult for an operator to maintain the desired clearance by visual means.

1.07 Excavation

- **1.07.01** Before excavating, the Contractor must determine whether any underground pipe lines, electric wires, or cables, including fiber optic cable systems are present and located within the Project work area. The Contractor must determine whether excavation on Railway's Property could cause damage to buried cables resulting in delay to Railway traffic and disruption of service to users. Delays and disruptions to service may cause business interruptions involving loss of revenue and profits. Before commencing excavation, the Contractor must contact **BNSF's Field Engineering Representative (909 386 4079)**. All underground and overhead wires will be considered HIGH VOLTAGE and dangerous until verified with the company having ownership of the line. **It is the Contractor's responsibility to notify any other companies that have underground utilities in the area and arrange for the location of all underground utilities before excavating.**
- **1.07.02** The Contractor must cease all work and notify the Railway immediately before continuing excavation in the area if obstructions are encountered which do not appear on drawings. If the obstruction is a utility and the owner of the utility can be identified, then the Contractor must also notify the owner immediately. If there is any doubt about the location of underground cables or lines of any kind, no work must be performed until the exact location has been determined. There will be no exceptions to these instructions.
- **1.07.03** All excavations must be conducted in compliance with applicable OSHA regulations and, regardless of depth, must be shored where there is any danger to tracks, structures or personnel.
- **1.07.04** Any excavations, holes or trenches on the Railway's Property must be covered, guarded and/or protected when not being worked on. When leaving work site areas at night and over weekends, the areas must be secured and left in a condition that will ensure that Railway employees and other personnel who may be working or passing through the area are protected from all hazards. All excavations must be back filled as soon as possible.

1.08 Hazardous Waste, Substances and Material Reporting

- **1.08.01** If Contractor discovers any hazardous waste, hazardous substance, petroleum or other deleterious material, including but not limited to any non-containerized commodity or material, on or adjacent to Railway's Property, in or near any surface water, swamp, wetlands or waterways, while performing any work under this Agreement, Contractor must immediately: (a) notify the Railway's Resource Operations Center at 1(800) 832-5452, of such discovery: (b) take safeguards necessary to protect its employees, subcontractors, agents and/or third parties: and (c) exercise due care with respect to the release, including the taking of any appropriate measure to minimize the impact of such release.

1.09 Personal Injury Reporting

- **1.09.01** The Railway is required to report certain injuries as a part of compliance with Federal Railroad Administration (FRA) reporting requirements. Any personal injury sustained by an employee of the Contractor, subcontractor or Contractor's invitees while on the Railway's Property must be reported immediately (by phone mail if unable to contact in person) to the Railway's representative in charge of the project. The Non-Employee Personal Injury Data Collection Form contained herein is to be completed and sent by Fax to the Railway at 1(817) 352-7595 and to the Railway's Project Representative no later than the close of shift on the date of the injury.

NON-EMPLOYEE PERSONAL INJURY DATA COLLECTION

INFORMATION REQUIRED TO BE COLLECTED PURSUANT TO FEDERAL REGULATION. IT SHOULD BE USED FOR COMPLIANCE WITH FEDERAL REGULATIONS ONLY AND IS NOT INTENDED TO PRESUME ACCEPTANCE OF RESPONSIBILITY OR LIABILITY.

1. Accident City/St _____ 2. Date: _____ Time: _____
County: _____ 3. Temperature: _____ 4. Weather _____
(if non-Railway location)
5. Social Security # _____
6. Name (last, first, mi) _____
7. Address: Street: _____ City: _____ St. _____ Zip: _____
8. Date of Birth: _____ and/or Age _____ Gender: _____
(if available)
9. (a) Injury: _____ (b) Body Part: _____
(i.e. (a) Laceration (b) Hand)
11. Description of Accident (To include location, action, result, etc.): _____
12. Treatment:
 ? First Aid Only
 ? Required Medical Treatment
 ? Other Medical Treatment
13. Dr. Name _____ 30. Date: _____
14. Dr. Address:
 Street: _____ City: _____ St: _____ Zip: _____
15. Hospital Name: _____
16. Hospital Address:
 Street: _____ City: _____ St: _____ Zip: _____
17. Diagnosis: _____

**FAX TO
RAILWAY AT (817) 352-7595
AND COPY TO
RAILWAY ROADMASTER FAX 909-386-4843**

OVERHEAD EXHIBIT "C -1"

**Agreement
Between
BNSF RAILWAY COMPANY
and the
CONTRACTOR**

BNSF RAILWAY COMPANY
Attention: Manager Public Projects

Railway File: 026110K
Agency Project: 16th. St. Overhead

Gentlemen:

The undersigned (hereinafter called, the "Contractor"), has entered into a contract (the "Contract") dated _____, 200_, with **SAN BERNARDINO ASSOCIATED GOVERNMENTS** for the performance of certain work in connection with the following project: demolish and reconstruct the 16th. Street Overhead, in San Bernardino, CA. Performance of such work will necessarily require contractor to enter BNSF RAILWAY COMPANY ("Railway") right of way and property ("Railway Property"). The Contract provides that no work will be commenced within Railway Property until the Contractor employed in connection with said work for **SAN BERNARDINO ASSOCIATED GOVERNMENTS** (i) executes and delivers to Railway an Agreement in the form hereof, and (ii) provides insurance of the coverage and limits specified in such Agreement and Section 3 herein. If this Agreement is executed by a party who is not the Owner, General Partner, President or Vice President of Contractor, Contractor must furnish evidence to Railway certifying that the signatory is empowered to execute this Agreement on behalf of Contractor.

Accordingly, in consideration of Railway granting permission to Contractor to enter upon Railway Property and as an inducement for such entry, Contractor, effective on the date of the Contract, has agreed and does hereby agree with Railway as follows:

Section 1. RELEASE OF LIABILITY AND INDEMNITY

Contractor hereby waives, releases, indemnifies, defends and holds harmless Railway for all judgments, awards, claims, demands, and expenses (including attorneys' fees), for injury or death to all persons, including Railway's and Contractor's officers and employees, and for loss and damage to property belonging to any person, arising in any manner from Contractor's or any of Contractor's subcontractors' acts or omissions or any work performed on or about Railway's property or right-of-way. **THE LIABILITY ASSUMED BY CONTRACTOR WILL NOT BE AFFECTED BY THE FACT, IF IT IS A FACT, THAT THE DESTRUCTION, DAMAGE, DEATH, OR INJURY WAS OCCASIONED BY OR CONTRIBUTED TO BY THE NEGLIGENCE OF RAILWAY, ITS AGENTS, SERVANTS, EMPLOYEES OR OTHERWISE, UNLESS SUCH CLAIMS ARE PROXIMATELY CAUSED BY THE WILLFUL MISCONDUCT OR SOLE NEGLIGENCE OF RAILWAY.**

THE INDEMNIFICATION OBLIGATION ASSUMED BY CONTRACTOR INCLUDES ANY CLAIMS, SUITS OR JUDGMENTS BROUGHT AGAINST RAILWAY UNDER THE FEDERAL EMPLOYEE'S LIABILITY ACT, INCLUDING CLAIMS FOR STRICT LIABILITY UNDER THE SAFETY APPLIANCE ACT OR THE LOCOMOTIVE INSPECTION ACT, WHENEVER SO CLAIMED.

Contractor further agrees, at its expense, in the name and on behalf of Railway, that it will adjust and settle all claims made against Railway, and will, at Railway's discretion, appear and defend any suits or actions of law or in equity brought against Railway on any claim or cause of action arising or growing out of or in any manner connected with any liability assumed by Contractor under this Agreement for which Railway is liable or is alleged to be liable. Railway will give notice to Contractor, in writing, of the receipt or dependency of such claims and thereupon Contractor must proceed to adjust and handle to a conclusion such claims, and in the event of a suit being brought against Railway, Railway may forward summons and complaint or other process in connection therewith to Contractor, and Contractor, at Railway's discretion, must defend, adjust, or settle such suits and protect, indemnify, and save harmless Railway from and against all damages, judgments, decrees, attorney's fees, costs, and expenses growing out of or resulting from or incident to any such claims or suits.

In addition to any other provision of this Agreement, in the event that all or any portion of this Article shall be deemed to be inapplicable for any reason, including without limitation as a result of a decision of an applicable court, legislative enactment or regulatory order, the parties agree that this Article shall be interpreted as requiring Contractor to indemnify Railroad to the fullest extent permitted by applicable law. **THROUGH THIS AGREEMENT THE PARTIES EXPRESSLY INTEND FOR CONTRACTOR TO INDEMNIFY RAILROAD FOR RAILROAD'S ACTS OF NEGLIGENCE.**

It is mutually understood and agreed that the assumption of liabilities and indemnification provided for in this Agreement survive any termination of this Agreement.

Section 2. TERM

This Agreement is effective from the date of the Contract until (i) the completion of the project set forth herein, and (ii) full and complete payment to Railway of any and all sums or other amounts owing and due hereunder.

Section 3. INSURANCE

Contractor must, at its sole cost and expense, procure and maintain during the life of this Agreement the following insurance coverage:

A. Commercial General Liability insurance. This insurance must contain broad form contractual liability with a combined single limit of a minimum of \$5,000,000 each occurrence and an aggregate limit of at least \$10,000,000. Coverage must be purchased on a post 1998 ISO occurrence form or equivalent and include coverage for, but not limit to the following:

- ◆ Bodily Injury and Property Damage
- ◆ Personal Injury and Advertising Injury
- ◆ Fire legal liability
- ◆ Products and completed operations

This policy must also contain the following endorsements, which must be indicated on the certificate of insurance:

- ◆ It is agreed that any workers' compensation exclusion does not apply to **Railroad** payments related to the Federal Employers Liability Act or a **Railroad** Wage Continuation Program or similar programs and any payments made are deemed not to be either payments made or obligations assumed under any Workers Compensation, disability benefits, or unemployment compensation law or similar law.
- ◆ The definition of insured contract must be amended to remove any exclusion or other limitation for any work being done within 50 feet of railroad property.
- ◆ Any exclusions related to the explosion, collapse and underground hazards must be removed.

No other endorsements limiting coverage as respects obligations under this Agreement may be included on the policy.

B. Business Automobile Insurance. This insurance must contain a combined single limit of at least \$1,000,000 per occurrence, and include coverage for, but not limited to the following:

- ◆ Bodily injury and property damage
- ◆ Any and all vehicles owned, used or hired

C. Workers Compensation and Employers Liability insurance including coverage for, but not limited to:

- ◆ California's statutory liability under the worker's compensation laws of the state(s) in which the work is to be performed. If optional under State law, the insurance must cover all employees anyway.
- ◆ Employers' Liability (Part B) with limits of at least \$500,000 each accident, \$500,000 by disease policy limit, \$500,000 by disease each employee.

D. Railroad Protective Liability insurance naming only the **Railroad** as the Insured with coverage of at least \$5,000,000 per occurrence and \$10,000,000 in the aggregate. The policy Must be issued on a standard ISO form CG 00 35 10 93 and include the following:

- ◆ Endorsed to include the Pollution Exclusion Amendment (ISO form CG 28 31 10 93)
- ◆ Endorsed to include the Limited Seepage and Pollution Endorsement.
- ◆ Endorsed to remove any exclusion for punitive damages.
- ◆ No other endorsements restricting coverage may be added.
- ◆ The original policy must be provided to the **Railroad** prior to performing any work or services under this Agreement

Other Requirements:

All policies (applying to coverage listed above) must not contain an exclusion for punitive damages and certificates of insurance must reflect that no exclusion exists.

Contractor agrees to waive its right of recovery against **Railroad** for all claims and suits against **Railroad**. In addition, its insurers, through the terms of the policy or policy endorsement, waive their right of subrogation against **Railroad** for all claims and suits. The certificate of insurance must reflect the waiver of subrogation endorsement. Contractor further waives its right of recovery, and its insurers also waive their right of subrogation against **Railroad** for loss of its owned or leased property or property under contractor's care, custody or control.

Contractor's insurance policies through policy endorsement, must include wording which states that the policy is primary and non-contributing with respect to any insurance carried by **Railroad**. The certificate of insurance must reflect that the above wording is included in evidenced policies.

All policy(ies) required above (excluding Workers Compensation and if applicable, Railroad Protective) must include a severability of interest endorsement and **Railroad** must be named as an additional insured with respect to work performed under this agreement. Severability of interest and naming **Railroad** as additional insured must be indicated on the certificate of insurance.

Contractor is not allowed to self-insure without the prior written consent of **Railroad**. If granted by **Railroad**, any deductible, self-insured retention or other financial responsibility for claims must be covered directly by contractor in lieu of insurance. Any and all **Railroad** liabilities that would otherwise, in accordance with the provisions of this **Agreement**, be covered by contractor's insurance will be covered as if contractor elected not to include a deductible, self-insured retention or other financial responsibility for claims.

Prior to commencing the Work, contractor must furnish to **Railroad** an acceptable certificate(s) of insurance including an original signature of the authorized representative evidencing the required coverage, endorsements, and amendments and referencing the contract audit/folder number if available. The policy(ies) must contain a provision that obligates the insurance company(ies) issuing such policy(ies) to notify **Railroad** in writing at least 30 days prior to any cancellation, non-renewal, substitution or material alteration. This cancellation

provision must be indicated on the certificate of insurance. Upon request from **Railroad**, a certified duplicate original of any required policy must be furnished. Contractor should send the certificate(s) to the following address:

EBIX BPO

PO Box 12010-BN
Hemet, CA 92546-8010
Fax number: 951-766-2299
Email: customerservice@certsonline.com

Any insurance policy must be written by a reputable insurance company acceptable to **Railroad** or with a current Best's Guide Rating of A- and Class VII or better, and authorized to do business in the state(s) in which the service is to be provide.

Contractor represents that this **Agreement** has been thoroughly reviewed by contractor's insurance agent(s)/broker(s), who have been instructed by contractor to procure the insurance coverage required by this **Agreement**. Allocated Loss Expense must be in addition to all policy limits for coverages referenced above.

Not more frequently than once every five years, **Railroad** may reasonably modify the required insurance coverage to reflect then-current risk management practices in the railroad industry and underwriting practices in the insurance industry.

If any portion of the operation is to be subcontracted by contractor, contractor must require that the subcontractor provide and maintain the insurance coverages set forth herein, naming **Railroad** as an additional insured, and requiring that the subcontractor release, defend and indemnify **Railroad** to the same extent and under the same terms and conditions as contractor is required to release, defend and indemnify **Railroad** herein.

Failure to provide evidence as required by this section will entitle, but not require, **Railroad** to terminate this **Agreement** immediately. Acceptance of a certificate that does not comply with this section will not operate as a waiver of contractor's obligations hereunder.

The fact that insurance (including, without limitation, self-insurance) is obtained by contractor will not be deemed to release or diminish the liability of contractor including, without limitation, liability under the indemnity provisions of this **Agreement**. Damages recoverable by **Railroad** will not be limited by the amount of the required insurance coverage.

For purposes of this section, **Railroad** means "Burlington Northern Santa Fe Corporation", "BNSF RAILWAY COMPANY" and the subsidiaries, successors, assigns and affiliates of each.

Section 4. EXHIBIT "C" CONTRACTOR REQUIREMENTS

The Contractor must observe and comply with the provisions, obligations, requirements and limitations contained in the Contract and the Contractor Requirements set forth on Exhibit "C" attached to the Contract and this Agreement, including, but not be limited to, payment of all costs incurred for any damages to Railway roadbed, tracks, and/or appurtenances thereto, resulting from use, occupancy, or presence of its employees, representatives, or agents or subcontractors on or about the construction site.

Section 5. TRAIN DELAY

Contractor is responsible for and hereby indemnifies and holds harmless Railway (including its affiliated railway companies, and its tenants) for, from and against all damages arising from any unscheduled delay to a freight or passenger train which affects Railway's ability to fully utilize its equipment and to meet customer service and contract obligations. Contractor will be billed, as further provided below, for the economic losses arising from loss of use of equipment, contractual loss of incentive pay and bonuses and contractual penalties resulting from train delays, whether caused by Contractor, or subcontractors, or by the Railway performing work under this Agreement. Railway agrees that it will not perform any act to unnecessarily cause train delay.

For loss of use of equipment, Contractor will be billed the current freight train hour rate per train as determined from Railway's records. Any disruption to train traffic may cause delays to multiple trains at the same time for the same period.

Additionally, the parties acknowledge that passenger, U.S. mail trains and certain other grain, intermodal, coal and freight trains operate under incentive/penalty contracts between Railway and its customer(s). Under these arrangements, if Railway does not meet its contract service commitments, Railway may suffer loss of performance or incentive pay and/or be subject to penalty payments. Contractor is responsible for any train performance and incentive penalties or other contractual economic losses actually incurred by Railway which are attributable to a train delay caused by Contractor or its subcontractors.

The contractual relationship between Railway and its customers is proprietary and confidential. In the event of a train delay covered by this Agreement, Railway will share information relevant to any train delay to the extent consistent with Railway confidentiality obligations. Damages for train delay for certain trains may be \$382.20 per hour per incident. **THE RATE THEN IN EFFECT AT THE TIME OF PERFORMANCE BY THE CONTRACTOR HEREUNDER WILL BE USED TO CALCULATE THE ACTUAL COSTS OF TRAIN DELAY PURSUANT TO THIS AGREEMENT.**

Contractor and its subcontractors must give Railway's representative 909 386 4079 eight (8) weeks advance notice of the times and dates for proposed work windows. Railway and Contractor will establish mutually agreeable work windows for the project. Railway has the right at any time to revise or change the work windows due to train operations or service obligations. Railway will not be responsible for any additional costs or expenses resulting from a change in work windows. Additional costs or expenses resulting from a change in work windows shall be accounted for in Contractor's expenses for the project.

Contractor and subcontractors must plan, schedule, coordinate and conduct all Contractor's work so as to not cause any delays to any trains.

Kindly acknowledge receipt of this letter by signing and returning to the Railway two original copies of this letter, which, upon execution by Railway, will constitute an Agreement between us.

(Contractor)

BNSF Railway Company

By: _____
Printed Name: _____
Title: _____

By: _____
Name: Melvin Thomas
Manager Public Projects

Contact Person: _____
Address _____

Accepted and effective this ____ day of 20__.

City: _____ State: ____ Zip: ____
Fax: _____
Phone: _____
E-mail: _____

EXHIBIT D

***** MAINTAIN PROPRIETARY CONFIDENTIALITY *****

BNSF RAILWAY COMPANY COMPANY ESTIMATE FOR SANBAG

LOCATION ONO

DETAILS OF ESTIMATE

PLAN ITEM: 000137254

VERSION: 1

PURPOSE, JUSTIFICATION AND DESCRIPTION

BNSF TO PROVIDE FLAGGING AND INSPECTION TO WIDEN I6TH STREET BRIDGE/215 FREEWAY
100% BILLABLE TO SANBAG
RDM JIMMY CAPPS DE ADAM RICHARDSON

MAINTAIN PROPRIETARY CONFIDENTIALITY

THE PHYSICAL LIMITS OF THIS PROJECT ARE DESCRIBED BY LINE SEGMENT, MILE POST RANGES, AND IN SOME CASES TRACK NUMBER. THIS IS THE PRIMARY AREA FOR THE PROJECT. THERE WILL BE CASES WHERE WORK MAY OCCUR BEYOND THE DEFINED LIMITS.

PROJECTS THAT INCLUDE SIGNAL, ELECTRICAL, OR TELECOMMUNICATION EQUIPMENT MAY REQUIRE ACTIVITY BEYOND THESE DEFINED TRACK LIMITS. ALL OR PORTIONS OF SOME PROJECTS MAY OCCUR IN AREAS WHERE NO MILEPOST SIGNS EXIST SUCH AS YARDS.

THIS ESTIMATE IS GOOD FOR 90 DAYS. THEREAFTER THE ESTIMATE IS SUBJECT TO CHANGE IN COST FOR LABOR, MATERIAL, AND OVERHEAD.

DESCRIPTION	QUANTITY U/M	COST	TOTAL \$
***** LABOR *****			
FLAGGING - OTHER R.O.W. - CAP	8100.0 MH	195,237	
PAYROLL ASSOCIATED COSTS		85,904	
DA OVERHEADS		400,235	
TOTAL LABOR COST		681,376	681,376
***** MATERIAL *****			
TOTAL MATERIAL COST		0	0
***** OTHER *****			
CONTRACT PREPARATION	1.0 LS	10,000	
INSPECTION / COORDINATION	135.0 DAY	81,000	
TOTAL OTHER ITEMS COST		91,000	91,000
PROJECT SUBTOTAL			772,376
CONTINGENCIES			15,447
BILL PREPARATION FEE			0
GROSS PROJECT COST			787,823
LESS COST PAID BY BNSF			0
TOTAL BILLABLE COST			787,823

Exhibit E



Melvin Thomas	BNSF Railway Company
<i>Manager Public Projects</i>	740 East Carnegie Drive
<i>Engineering Services</i>	San Bernardino, CA 92408
	Office: 909-386-4472
	Fax: 909-386-4479
	Cell: 909-831-8199
	Email: melvin.thomas@bnsf.com

Date:

Garry Cohoe
Director of Freeway Construction
San Bernardino Associated Governments
1170 W. 3rd Street, 2nd Floor
San Bernardino, CA 92410

Re: Final Approval of Plans and Specifications dated _____ by
(consultant) (**hereinafter called, the "Plans and Specifications"**)

Dear Mr. Cohoe:

This letter serves as BNSF RAILWAY COMPANY'S ("BNSF") final written approval of that portion of the Plans and Specifications covering the Project's concept for reconstruction of the 16th. Street Overhead, U.S. D.O.T. No. 026110K involving the vertical and horizontal clearances from the bridge soffit and the face of the columns, piers, and/or abutments which ever be the case, the location of the piers and abutments, and crash walls that will be constructed adjacent or on BNSF's Rail Corridor. This final written approval is given to SAN BERNARDINO ASSOCIATED GOVERNMENTS ("SANBAG") pursuant to Article III, Section 1 of that certain Overhead Agreement between BNSF, SANBAG, and the STATE of CALIFORNIA, which this Exhibit E is attached to and made a part thereof.

If the Plans and Specifications are revised by SANBAG subsequent to the date set forth above, this letter shall no longer serve as final written approval of the Plans and Specifications and SANBAG must resubmit said Plans and Specifications to BNSF for final written approval.

It is understood that the approvals contained in this letter do not cover, the approvals of plans and specifications for any falsework, shoring, and demolition that may be subsequently submitted to BNSF by SANBAG or its contractor for approval.

Respectfully,

Melvin Thomas

Manager Public Projects
BNSF Railway

Exhibit F

BNSF Bridge Requirements

BRIDGE DESIGN, PLANS & SPECIFICATIONS:

Except for the design of temporary falsework and shoring, BNSF review of the Structure plans will be limited to the vertical and horizontal clearances, sight distance for existing train signals, foundation dimensions and drainage characteristics as they relate to existing and future tracks. BNSF will not review structural design calculations for the permanent Structure unless a member or members are influenced by railroad live loads.

Temporary falsework and shoring plans and calculations must be reviewed and approved by BNSF prior to beginning construction. SANBAG shall perform an independent review of the design calculations for temporary falsework and shoring prior to submitting them to BNSF for approval. Temporary construction clearances must be no less than 15 feet measured horizontally from the centerline of the nearest track and 21 feet-6inches measured vertically from the top of rail of the most elevated track to the bottom of lowest temporary falsework member. State regulatory agencies may have more restrictive requirements for temporary railroad clearances.

For the permanent Structure, SANBAG will submit plans showing the least horizontal distance from the centerline of existing and future tracks to the face of the nearest member of the proposed Structure. The location of the least horizontal distance must be accurately described such that BNSF can determine where it will occur in both the horizontal and vertical plane. The general policy of the Burlington Northern and Santa Fe (BNSF) with regard to bridge and related crash wall construction is to follow the current recommendations of the American Railway Engineering and Maintenance-of-Way Association (AREMA) Current AREMA recommended practice in Manual for Railway Engineering Chapter 8 (Art. 2.1.5.1). Crash Walls will not be required for the construction of the 16TH. Street Overpass Project, U.S. D.O.T. No. 26110K, as provided for in Article I of this Agreement.

For the permanent Structure, SANBAG will submit plans showing the least vertical clearance from top of the most elevated rail of existing and future tracks to the lowest point of the proposed Structure. Prior to beginning construction of the permanent Structure, the top of rail elevations should be checked and verified that they have not changed from the assumed elevations utilized for the design of the bridge.

Prior to issuing any invitation to bid on construction of the Structure, SANBAG should conduct a pre-bid meeting where prospective Contractors have the opportunity to communicate with BNSF personnel regarding site specific train speeds, train density, and general safety requirements for men and equipment working near live tracks. Any invitation to bid and specifications for the Structure must be submitted to BNSF for review and approval prior to letting of bids for the Project.

BRIDGE CONSTRUCTION:

After awarding the bid, but prior to the Contractor entering BNSF's railroad corridor or property, SANBAG should conduct a pre-construction meeting with BNSF personnel in attendance to reiterate the safety requirements of construction activity adjacent to live tracks.

During construction, BNSF may require an independent engineering inspector to be present during certain critical activities of the Project, including but not limited to: driving foundation piles, erecting falsework, construction of shoring and retaining walls, placing concrete, placing soil backfill and compaction processes. SANBAG shall reimburse BNSF for all costs of supplemental inspection services.

Within 90 days of the conclusion of the Project and final acceptance by BNSF, SANBAG will provide BNSF with a complete electronic set of the bridge plans. BNSF will also accept a marked up paper copy of the bridge plans

labeled "As Built". The marked up paper copy of the plans will reflect any and all deviations from the original plans that occurred during construction. The electronic set of the bridge plans will be submitted in Micro Station *.dgn electronic format (preferred) or AutoCAD *.dwg format. Electronic plans are to be submitted in the original format used for CAD plan preparation and not converted to another format prior to submission. The "As Built" plans shall show actual measured "as constructed" clearances shall be shown as well as depth, size and location of all foundation components. The plans shall show dimensioned locations of existing and relocated utilities. It is understood that BNSF prefers to receive the "As Built" plans in an electronic format.

BRIDGE MAINTENANCE:

STATE will be responsible for maintenance and repair of the Structure including the earth retention components, embankment slopes, erosion control, surface drainage, fencing, deck drains, landscaping, paint, walkways, handrails, lighting, and other improvements associated with the Project.

Fencing and other pedestrian access controls within BNSF's rail corridor and incorporated into the Project shall be designed and maintained by SANBAG through construction. Trespasser control shall be the responsibility of SANBAG through construction. Graffiti removal will be the responsibility of STATE.

BRIDGE INSPECTION:

STATE will conduct annual routine structural inspections. In the event of an earthquake, fire, flood, damage from vehicular impacts or other emergent situations, STATE will provide an immediate inspection by qualified personnel and notify BNSF of damage that may affect safe passage of trains. If necessary STATE will embargo weights or provide lane closures or other such measures to protect the structural integrity of the Structure such that there can be continuous safe passage of trains until repairs are made.

BRIDGE ALTERATIONS:

Except as provided otherwise by this Agreement, there will be no alterations made to the Structure that will alter the railroad vertical or horizontal clearances provided by the original design

It is expressly understood by STATE that the right to install utilities is restricted to the placement of underground utilities beneath BNSF's tracks located a minimum of fifty (50) feet from abutments, piers, piles, or footings. Under no circumstances will utilities be allowed to hang from the Structure, unless approved by BNSF. All utility crossings within the limits of BNSF's Rail Corridor will be covered by separate agreements between BNSF and each of the owners of the utilities.

EXHIBIT G

INSTRUCTIONS FOR PREPARATION OF DEMOLITION PLANS FOR STRUCTURES OVER THE BURLINGTON NORTHERN SANTA FE RAILROAD

SECTION I. GENERAL

A. The Contractor will abide by and adhere to the requirements of the Exhibit C. Should there be a discrepancy between the requirements contained in the Exhibit C and this Exhibit G, the Exhibit C will govern.

B. The Contractor's work shall in no way impede train operations.

1. The term "Overhead" refers to the structure to be demolished.
2. The words "demolition" and "removal" will be used interchangeably in this Exhibit G.
3. The term "Railroad" refers to the Railroad's Engineer or designated representative.

C. Safety takes precedence over productivity. The Contractor shall be responsible for planning and executing all procedures necessary to remove the Overhead in a safe, predictable manner. All employees of the Contractor and Subcontractors must be Safety Trained. Refer to <http://www.contractororientation.com>.

D. The Contractor shall develop a Demolition Plan ONLY AFTER CONSULTING WITH THE RAILROAD TO GET AN ESTIMATE OF THE RANGE OF WORK WINDOWS THAT MIGHT NORMALLY BE AVAILABLE FOR THE JOB SITE.

1. A Work Window is the elapsed time between approaching trains.
2. An estimate of the availability of Work Windows can be used by the Contractor to design a Demolition Plan. The estimated Work Window is a guideline and not to be considered as a guarantee for available working time.
3. Work Windows will vary significantly, depending on the location. Low speed - low train density tracks have predictable Work Windows. The opposite is true for high density- high speed main tracks. The Railroad shall, at its sole discretion, furnish a range of Work Windows that might be expected at a specific location under normal train traffic conditions.
4. The Contractor shall plan the demolition procedures based upon the smallest ESTIMATED Work Window. Do not assume the longest Work Window will be available on any given day. Do not assume the same Work Windows will be available from one day to the next.
5. The Contractor will give BNSF's Project Engineer at telephone number 909-386-4079, eight (8) weeks advance notice of the proposed times and dates for Work Windows. BNSF and the contractor will establish mutually agreeable Work Windows for the Project. Any request for Work Windows with less than eight (8) weeks advance notice will have a reduced probability of approval. BNSF has the right at any time to revise or change the Work Windows, due to train operations or service obligations. BNSF will not be responsible for any additional costs and expenses resulting from a change in Work Windows. Additional costs and expenses resulting from a change in Work Windows shall be accounted for in the contractor's expenses for the Project.

E. The Railroad's tracks and property shall be protected at all times.

1. Removal procedures shall take into account SEVERE WEATHER CONDITIONS, including high winds, heavy rains and snowfall accumulation.

2. The contractor shall ensure that all areas adjacent to active tracks shall remain free from hazards.
 - a) Trainmen must have an unobstructed walkway available parallel to all active tracks pursuant to the California Public Utilities Commission General Order 118.
 - b) All open excavations shall be protected with fencing.
 - c) Do not store materials or equipment within 25 feet of the centerline of an active track.
3. Protect the project area from vandalism.
 - a) Do not leave debris where vandals could place it on the tracks or drop it onto the tracks from the Overhead.
 - b) Secure all heavy equipment from potential movement by vandals.
 - c) Do not store flammable materials on railroad right of way. Remove combustible waste materials daily. Do not store fuel or other flammable liquids on railroad right of way.

F. All demolition materials and scrap shall be disposed of outside the Railroad right-of-way at no expense to the Railroad. At the conclusion of the project, the area must be left in a clean and graded condition to the exclusive satisfaction of the Railroad.

G. No work is allowed within 25 feet of the nearest track unless protected by a Railroad Flagger. Refer to Exhibit C Section 1.05, Protection of Railway Facilities and Railway Flagger Services for additional flagging requirements.

H. The staged demolition of any portion of the Overhead over or adjacent to operational tracks will not jeopardize the stability of other parts of the Overhead awaiting demolition.

1. Where multiple tracks are involved, the Demolition Plan should be engineered as much as practical such that no more than one track is rendered impassable at any given moment.

I. No blasting will be permitted on Railroad's right-of-way.

SECTION II. DEMOLITION PLAN

A. The Contractor shall submit a detailed Demolition Plan to the Railroad. The Demolition Plan shall encompass the following:

1. Provide a scale drawing showing the plan view, elevation and location of the Overhead and locations of any access roads needed on railroad right of way to access the job site. The as-built drawings may be used for the submittal provided the removal steps are clearly marked and legible.
2. Indicate the position of all railroad tracks below the bridge. Identify each track as mainline, siding, spur, etc. Identify locations where temporary crossings will be installed to cross equipment over each track.
3. List in sequential order, all procedures necessary to remove the bridge in a safe and controlled manner. Include step by step details of each sequence and the elapsed time required to execute the sequence. The Demolition Plan must specify which, if any, sequences will render a track impassable to trains during execution of the sequence. If more than one track is adjacent to the work area, specify which tracks will be impassable during execution of each sequence.
4. Include text, drawings or photos to communicate the types of equipment that will be utilized. Include diagrams showing the position of the equipment in relation to the tracks. Where cranes are to be used, furnish the lifting capacities of the crane at the anticipated radius and the weights of components to be removed.

5. For every sequence, specify the minimum horizontal clearance from centerline of track and the minimum vertical clearance above top of rail for equipment, falsework, rubble shields and temporary supports. If a crane is to be utilized, include clearances for the backswing radius of the crane counterweight and the position of the outriggers. Refer to the Frame Protection Details drawings, three sheets, attached hereto and made a part hereof, for the minimum allowable vertical and horizontal clearances.

6. If the Demolition Plan includes concrete demolition, include the details of rubble control such as maximum anticipated size of rubble, drop distance, shield size and shield position.

7. The Demolition Plan will indicate locations and types of temporary supports, shoring, cables or bracing required.

a) Excavations and shoring design shall be according to the attached "GENERAL SHORING REQUIREMENTS" drawings, two pages, attached hereto and made a part hereof.

b) Falsework shall be designed according to the State of California, Department of Transportation FALSEWORK MANUAL available at this Web Site:

[http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/FalseworkManual\(Rev32\).pdf](http://www.dot.ca.gov/hq/esc/construction/manuals/OSCCCompleteManuals/FalseworkManual(Rev32).pdf).

c) Plans shall conform to the appropriate Federal, State and local regulations and building codes.

8. If any temporary supports interfere with the natural drainage along the Railroad right-of-way, a temporary drainage diversion plan shall be included in the Demolition Plan. The drainage plan shall route all surface water away from the railroad tracks.

a) Do not block drainage in side ditches with debris.

b) Do not place footing blocks in drainage ditches.

c) Surface runoff must be diverted away from the footing block excavations to avoid saturation of the underlying supporting soils.

9. The Demolition Plan shall include details, limits, and locations of protective shields or other measures designed to protect the rails, ties and ballast from falling debris. Include details of catchment apparatus necessary to protect the tracks from rolling debris that may fall onto side slopes. Include the design load for the shields for both the maximum static load and the maximum anticipated impact loads from falling debris. Specify the type of equipment that will be utilized to remove the debris and shields from operational tracks.

10. Protection of the track ballast section must be provided to avoid contamination of the rock with fine dust and mud produced during demolition activities. Filter fabric or some other effective means to prevent ballast contamination should be incorporated into the Demolition Plan.

11. All overhead and underground utilities in the area affected by removal of the bridge shall be located on the drawings, including any fiber optic, railroad signal, and communication lines.

12. Indicate the limits of demolition of substructures, including depths and dimensions of excavations that might be necessary to demolish buried footings.

13. The Demolition Plan should include details of planned on-site fire suppression.

B. The Contractor shall submit to the Railroad: three (3) complete sets of the Demolition Plan to BNSF's Assistant Director Structural Engineering for review and comments. The Demolition Plan should be sent in PDF format for files up to (2) megabytes by email attachment to: Donald.Lozano@bnsf.com. Should the Demolition Plan exceed a two (2) megabyte PDF file, a CD of the plans and specifications should be sent via overnight mail service to mailing address , 4515 Kansas Avenue, Kansas City, KS 66106.

1. The Plan shall be sealed by a Civil or Structural Engineer registered in the state where the proposed demolition will take place.
2. A minimum of four (4) weeks shall be expected for the Railroad's review after the complete submittal is received.
3. No removal operations will be permitted over the Railroad right of way until the submitted material has been reviewed and approved.

C. Approval and/or comments furnished by the Railroad in the course of review of the Contractor's Demolition Plan will not relieve the Contractor of the ultimate responsibility for the safe and secure demolition of the Overhead.

SECTION III. PROCEDURE

A. The Demolition Plan must be executed such that stability is continuously maintained for the standing portions of the Overhead over all tracks.

1. All members of the Overhead being demolished must be continuously supported to resist high winds, including wind buffets and suction forces generated by high speed trains.

B. Prior to proceeding with bridge removal, the sealing Civil or Structural Engineer, or his authorized representative, shall inspect all components of the temporary support shoring, including temporary bracing and protective coverings, insuring conformity with the working drawings.

1. The sealing Engineer shall certify in writing to the Railroad that the work is in conformance with the drawings and that the materials and workmanship are satisfactory.
2. A copy of this certification shall be available at the job site at all times.

C. All substructures shall be removed to at least six (6) feet below the final finished grade or at least six (6) feet below base of rail whichever is lower, unless otherwise specified by the Railroad.

D. All debris and refuse shall be removed from the railroad right of way by the Contractor. The premises shall be left in a neat and presentable condition to the exclusive satisfaction of the Railroad. Soils contaminated by fuel spills, hydraulic oil leaks, etc. will be removed from railroad right of way and replaced to the exclusive satisfaction of the Railroad.

E. If any hazardous materials are discovered, provide material protection as specified in local hazardous material codes and immediately contact the Railroad

1. If Contractor discovers any hazardous waste, hazardous substance, petroleum or other deleterious material, including but not limited to any non-containerized commodity or material, on or adjacent to Railway's Property, in or near any surface water, swamp, wetlands or waterways, while performing any work under this Agreement, Contractor must immediately: (a) notify the Railway's Resource Operations Center at 1(800) 832-5452, of such discovery: (b) take safeguards necessary to protect its employees, subcontractors, agents and/or third parties: and (c) exercise due care with respect to the release, including the taking of any appropriate measure to minimize the impact of such release.

2. If pipelines are attached to the Overhead, pipes must be purged of flammable or hazardous materials prior to beginning demolition.

3. Fuel spills, hydraulic fluid releases, equipment oil leaks or any other release of contaminants must be

reported to the Railroad. Contaminated soils must be removed and replaced to the satisfaction of the Railroad and local regulatory agencies.

F. The work progress shall be reviewed and logged by the Contractor's Engineer. Should an unplanned event occur, the Contractor shall inform the Railroad and submit a procedure to correct or remedy the occurrence.

G. Beam removal and all other demolition procedures shall take place as much as practicable with equipment positioned adjacent to and clear of all live tracks or positioned on the Overhead structure above the track. In the rare case that beams require removal with equipment positioned fouling a live track or from below the Overhead, the following steps shall be taken before beams are allowed to straddle the tracks:

1. Certain territories with high density train traffic, especially where multiple main tracks are affected, may not grant Work Windows on all tracks simultaneously. Beam removal from the underside of Overheads may not be possible unless the procedure can be accomplished in very short Work Windows or be engineered such that only one track is affected.
2. The work shall be scheduled well in advance but no later than the requirements in Section 1, paragraph 5 of this Exhibit G. The Work windows are subject to the Railroad's operational requirements for continuous train operations. The beam removal plan must be engineered to minimize the Work Window time.
3. The rails, ties and ballast shall be protected. No equipment will be crossed over or placed on the tracks unless pre-approved by the Railroad.
4. The beams shall be blocked to prevent the beams from coming into contact with the rails. Blocking shall not be placed on the rails or ties.
5. Upon approach of a train, the beams and all personnel and equipment will be moved a position to provide a minimum of 15 feet horizontal clearance and 21 ft. 6 in. vertical clearance from the nearest rail. Care must be exercised to insure that crane booms are rotated to a position parallel with the track.

SECTION IV. TRACK PROTECTION

A. The track protective cover shall be constructed before beginning bridge removal work and will be supported by falsework or members of the existing Overhead. The following are examples of protective covers that may be acceptable:

1. A decking supported by the bridge or a suspended cover from the bridge above the track clearance envelope.
2. A track shield cover over the tracks per the attached detail.
3. A framed cover outside the track clearance envelope.
4. A catcher box or loader bucket under decking and parapets overhanging the exterior girders.
5. Protection of the track ballast section must be provided to avoid contamination of the rock with fine dust and mud produced during demolition activities. Filter fabric or some other effective means to prevent ballast contamination should be incorporated into the Demolition Plan.

B. Construction equipment shall not be crossed over or placed on the tracks unless the rails, ties and ballast are protected against damage.

1. Track protection is required for all equipment including rubber tired equipment.

2. A list of equipment to be crossed over or positioned on the tracks along with the intended method of protection shall be submitted to the railroad for approval prior to use at the job site.

C. Temporary haul road crossings shall be either timbers or precast concrete panels. The type of crossing shall be determined by the Railroad.

1. Solid timbers or ballast with timber headers shall be used between multiple tracks.
2. If the job site is accessible to the public, all temporary haul road crossings shall be protected with barricades or locked gates when the Contractor is not actively working at the site.
3. Installation and removal of temporary track crossings for equipment shall be scheduled well in advance with the Railroad but no later than the requirements in Section 1, paragraph 5 of this Exhibit G.

SECTION V. CRANES

A. When cranes are operated over or adjacent to the tracks the following is required:

1. The Contractor shall verify that the foundations, soil conditions, and buried utility lines under the crane and crane outriggers can support the loads induced by the crane under an assumed maximum capacity lift. The size and material type of crane mats shall be rigid and of sufficient capacity to safely distribute the crane loads.
2. Front end loaders and backhoes cannot be used in place of a crane to lift materials over the tracks. These types of equipment do not have the necessary safety features built into the machines to circumvent overloading and tipping. Only cranes with the rated capacity to handle the loads may be used.
3. Additional track protection may be required for a crane when crossing over the track. The protection methods shall be submitted to the Railroad for review and comment well in advance of intended use.
4. Cranes and other equipment utilizing outriggers shall not place outriggers on the tracks or ballast.
5. Cranes or crane booms shall not be positioned within the track clearance envelope without Railroad Flagman protection. Cranes operating from a position farther than 25 ft. from the nearest track will need a Railroad Flagman present if the boom length is such that it could fall onto a track.
6. Upon approach of a train, the crane body shall be rotated to position the boom in a line parallel with the track. Any suspended load shall be made stationary by lowering it until contact is made with the ground. During passage of the train, the Crane Operator must stop all movements. Crane Operators shall remain in the cab with motor at idle with the load lines, boom, rotation and travel controls locked and stationary until the full length of the train has passed the job site.
7. Cranes will not be utilized during high winds.

SECTION VI. CUTTING TORCHES

A. When a cutting torch or welding equipment is used in the demolition process, the following steps shall be taken:

1. Fire suppression equipment is required on-site.
2. Do not use a torch over, between, or adjacent to the tracks unless a steel plate protective cover is used to shield against sparks and slag coming into contact with timber ties. Care shall be taken to make certain the use of a steel plate does not come in contact with the rails. See "Track Shield Details" for other requirements. Details of the shield shall be submitted to the Railroad for approval.
3. Wet the ties below the steel plate and wet other timbers and flammable demolition debris located near cutting areas.
4. Monitor the work site for at least three hours after cutting has ceased to detect a smoldering fire.

B. Extensive overhead cutting may require more robust fire suppression equipment and precautions than what would normally be required for routine cuts.

1. On days when extensive torch cutting is planned, the Contractor shall have a larger water supply on hand or take other measures as needed to effectively suppress fires.
2. Overhead torch cutting and welding must cease upon approach and passage of a train.
3. Extensive torch cutting shall not take place during high winds.
4. Contractor will clear vegetation and other combustible debris from the surrounding work areas prior to engaging in extensive torch cutting.

SECTION VII. UTILITIES

A. The demolition operations shall be planned such that overhead and underground utility lines are operating safely at all times. The utility lines shall be protected if affected by demolition operations. Underground utility lines shall be protected from concentrated soil loads under crane outriggers and heavy rubber tired front loaders or similar equipment. All the work associated with utility lines should be coordinated by the contractor with the respective utility companies.

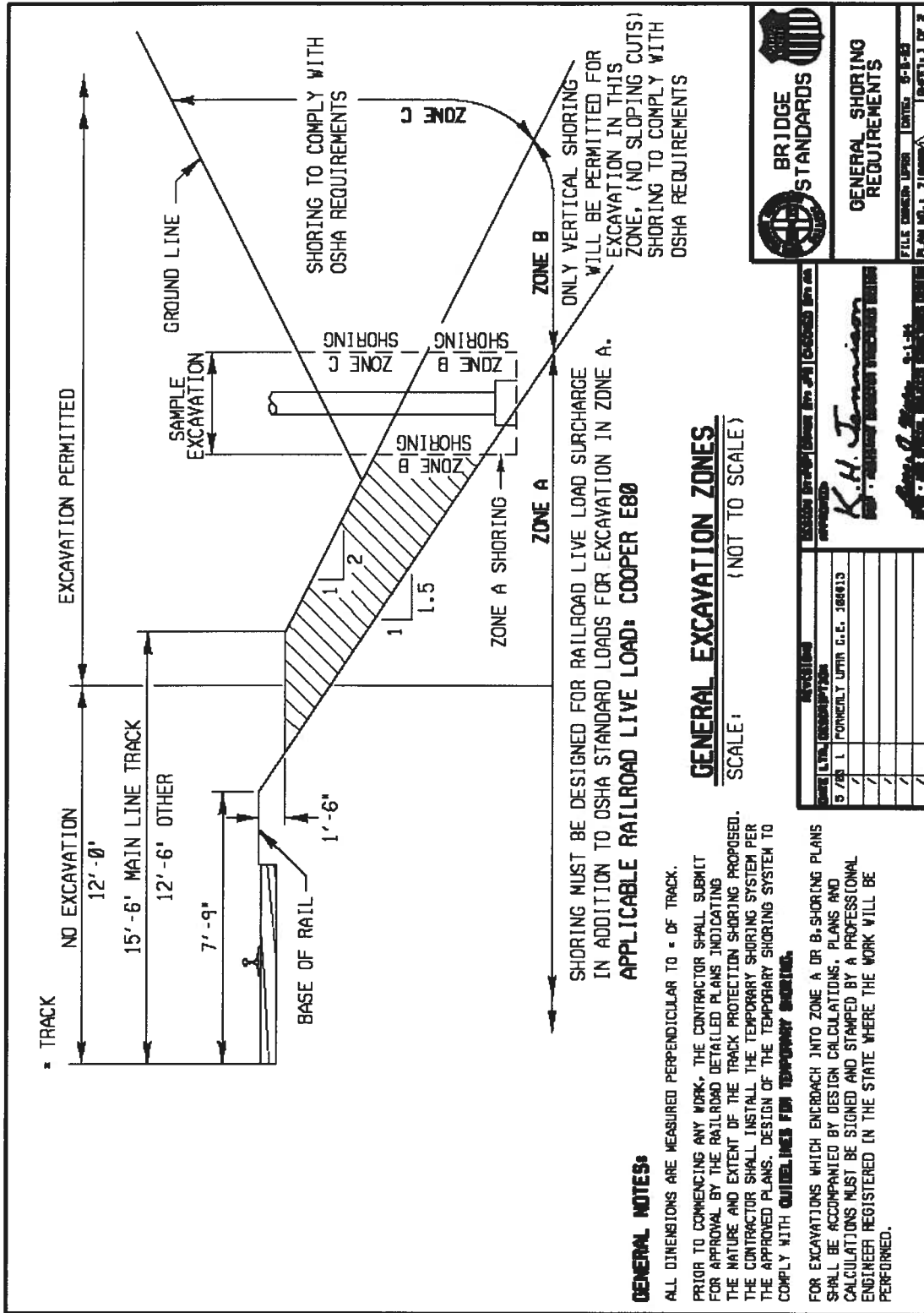
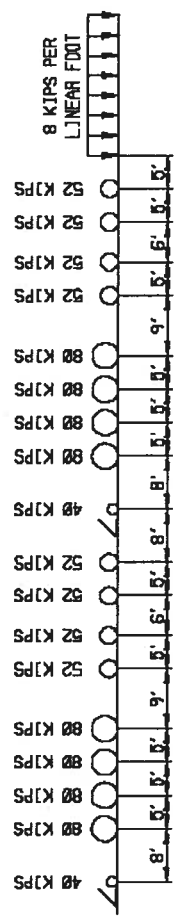


FIGURE 1

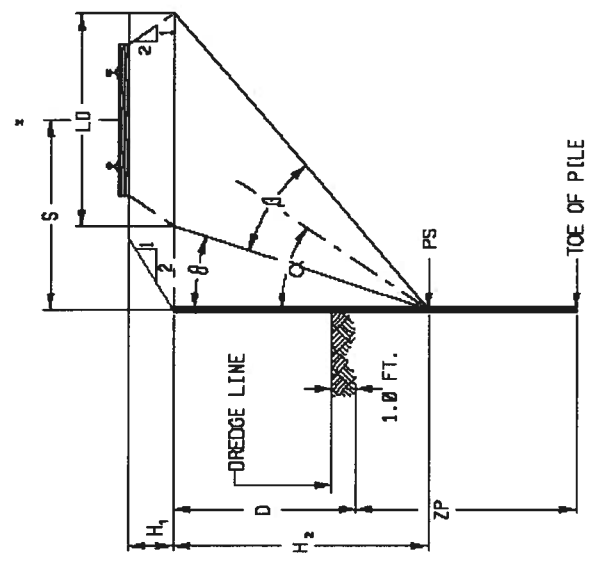


CORNER EBB LOAD
SCALE: (NOT TO SCALE)

VERTICAL PRESSURE D SHALL BE BASED ON A DISTRIBUTION WIDTH LD .
 LD IS THE LENGTH OF TIE PLUS H_1 .
 H_1 IS THE HEIGHT FROM THE BOTTOM OF TIE TO THE TOP OF SHORING.
 H_2 IS THE DEPTH OF POINT BEING EVALUATED WITH THE BOUSSINESQ EQUATION.
 S IS A DISTANCE PERPENDICULAR FROM CENTERLINE OF TRACK TO THE FACE OF SHORING.
 D IS FROM TOP OF SHORING TO ONE FOOT BELOW DREDGE LINE.
 ZP IS THE MINIMUM EMBEDMENT DEPTH.
 LD IS 9 FEET
 D IS THE INTENSITY OF STRIP LOAD DUE TO EBB RAILROAD LIVE LOAD
 AND SHALL BE CALCULATED AS FOLLOWS:
 FOR $H_1 = 0$ $LD = \text{LENGTH OF TIE} + H_1$; THEREFORE, $D = \frac{80,000 \text{ LB}}{(5 \text{ FEET})(9 \text{ FEET})} = 1,778 \text{ PSF}$
 FOR $H_1 \neq 0$ $LD = \text{LENGTH OF TIE} + H_1$; THEREFORE, $D = \frac{80,000 \text{ LB}}{(5 \text{ FEET})(LD)}$

CASE 1: LATERAL LIVE LOAD PRESSURE PS , DUE TO EBB LOADING FOR TRACK PARALLEL.
 TO SHORING SYSTEM IS CALCULATED USING THE BOUSSINESQ STRIP LOAD EQUATION.
 $PS = \frac{2D}{\pi} \left(\beta + \sin \beta \sin^2 \alpha - \sin \beta \cos^2 \alpha \right)$
 THE ABOVE EQUATION CAN BE SIMPLIFIED INTO THE FOLLOWING EQUIVALENT FORM:
 $PS = \frac{2D}{\pi} \left(\beta + \sin \beta \cos (2\alpha) \right)$
 α AND β ARE ANGLES MEASURED IN RADIAN; $\alpha = \theta + \frac{\beta}{2}$

CASE 2: LIVE LOAD PRESSURE DUE TO EBB LOADING FOR TRACK AT A RIGHT ANGLE TO THE SHORING SYSTEM CAN BE CALCULATED USING THE FOLLOWING EQUATION.
 $PS = K_a Q$
 WHERE $K_a = \tan^2 \left(45 - \frac{\phi}{2} \right)$
 ϕ IS THE ANGLE OF INTERNAL FRICTION IN DEGREES



PLAN
SCALE: (NOT TO SCALE)

DATE	DESCRIPTION

BRIDGE SHORING STANDARDS

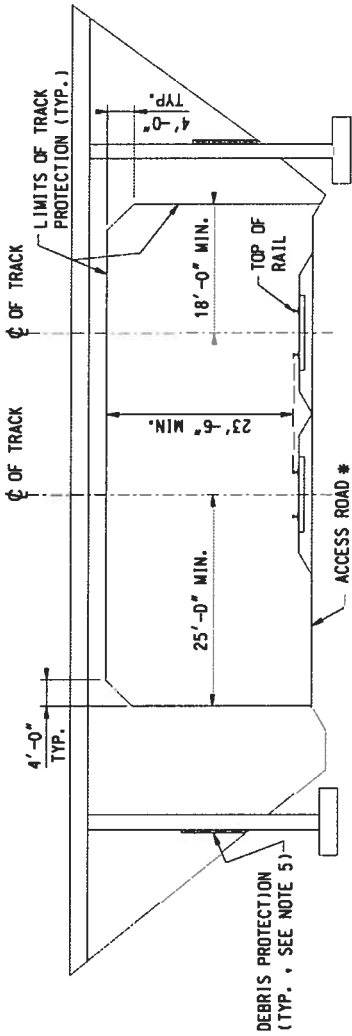
GENERAL SHORING REQUIREMENTS

FILE NUMBER: 710091
 DATE: 11-2-07
 SHEET: 2 OF 2

DESIGNED BY: *K.H. Tennison*
 CHECKED BY: *[Signature]*
 DATE: 11-2-07

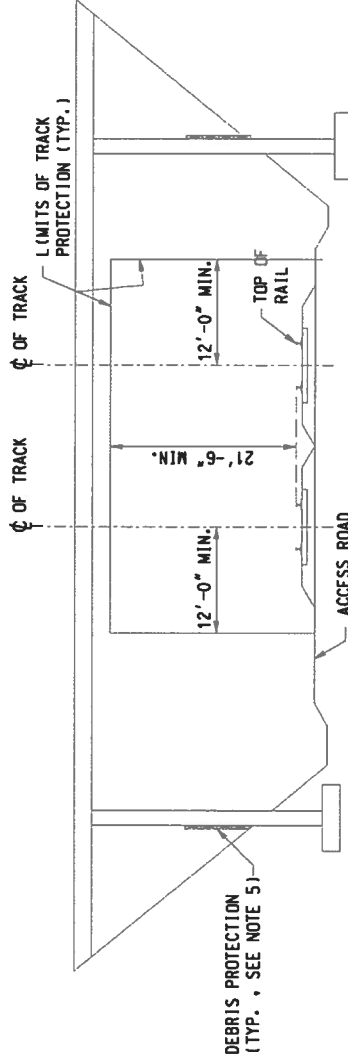
APPROVED BY: *[Signature]*
 DATE: 11-2-07

FIGURE 2



BRIDGE ELEVATIONS

STANDARD LIMITS OF PROTECTION FOR FRAME PROTECTION



BRIDGE ELEVATION

MINIMUM LIMITS OF PROTECTION FOR FRAME PROTECTION

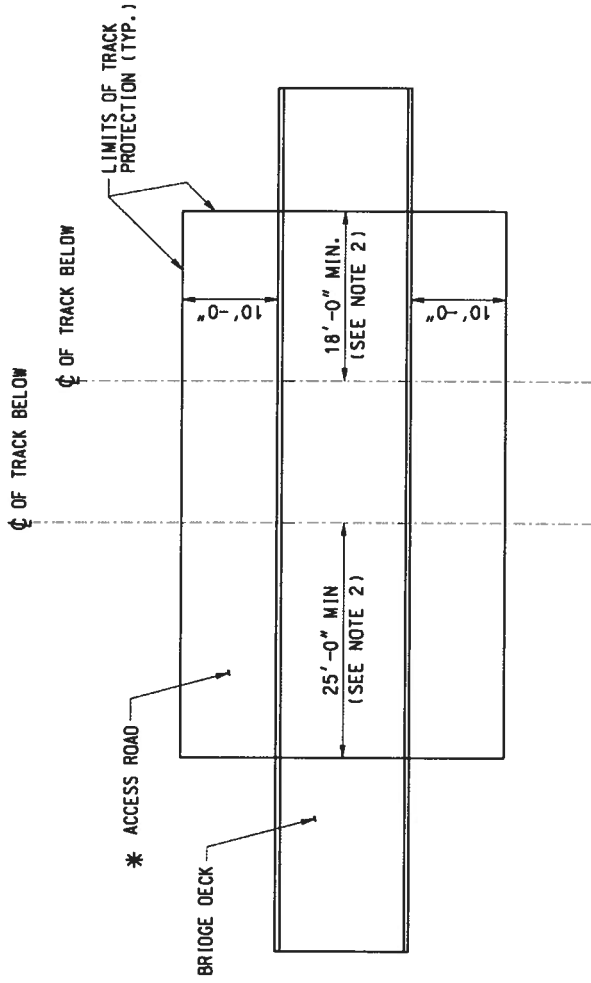
(SPECIAL PERMISSION REQUIRED, SEE NOTE 1)

1. THE STANDARD LIMITS OF PROTECTION NOTED ARE THE MIN. CLEARANCES ALLOWED WITHOUT SPECIAL PERMISSION FROM THE RAILROAD. THE REDUCED CLEARANCES NOTED MAY BE ALLOWED BY THE RAILROAD. SPECIAL PERMISSION FOR THE REDUCED CLEARANCES IS REQUIRED FROM THE RAILROAD AND PUBLIC AGENCY.
 2. THE PROTECTION FRAME SHALL AS A MINIMUM MATCH THE DEMOLITION LIMITS SHOWN AND EXTEND PAST THE BRIDGE WIDTH AS SHOWN ON THE ATTACHED DEMOLITION PLAN SHEET.
 3. FOR ADDITIONAL CLEARANCE AND PROTECTION INFORMATION REFER TO CONTRACT EXHIBITS.
 4. THE PROTECTION FRAME SHALL PREVENT DEMOLITION DEBRIS, DUST AND FINE MATERIAL FROM FALLING INTO THE RAILROAD TRACKS, ACCESS ROAD OR TRAINS. THE FRAME SHALL BE DESIGNED BY THE CONTRACTOR TO SUPPORT THE ANTICIPATED DEMOLITION LOADS, AND IN ACCORDANCE WITH CALTRANS FALSEWORK MANUAL FOR STRUCTURES OVER THE RAILROAD.
 5. DEBRIS PROTECTION IS REQUIRED NEAR THE BASE OF THE SIDE SLOPES AND ADJACENT TO ROADS USED BY DEMOLITION EQUIPMENT TO PREVENT DEBRIS FROM ROLLING ONTO TRACK. ACCESS ROAD OR DITCH. USE TIMBERS AS REQUIRED TO STOP LARGE PIECES OF ROLLING DEBRIS.
 6. ANY ACTIVITY WITHIN 25 FEET OF THE NEAREST RAIL OF A TRACK REQUIRES A FLAGMAN.
- * IF NO ACCESS ROAD USE MIN. DIMENSION FROM OTHER SIDE OF DETAIL



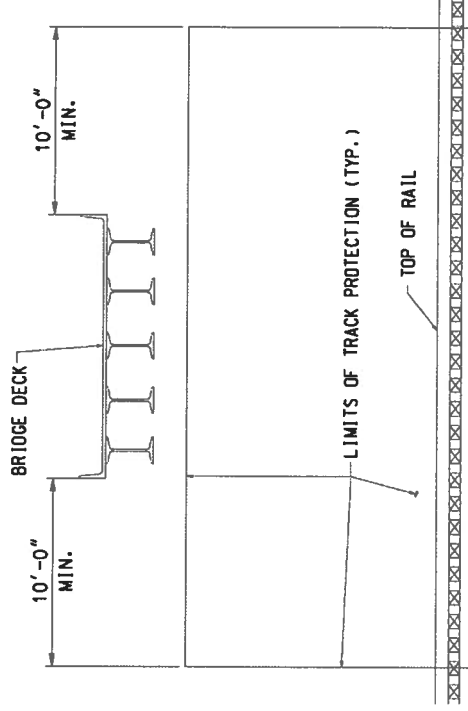
DEMOLITION FRAME PROTECTION DETAILS

DATE: OCTOBER 17, 2007 SHEET: 1 OF 3



NOTES:

1. SEE GENERAL NOTES ON BRIDGE ELEVATION SHEET.
2. STANDARD LIMITS OF PROTECTION ARE SHOWN. FOR MIN. LIMITS OF PROTECTION DIMENSIONS, SEE BRIDGE ELEVATION. MINIMUM LIMITS OF PROTECTION.



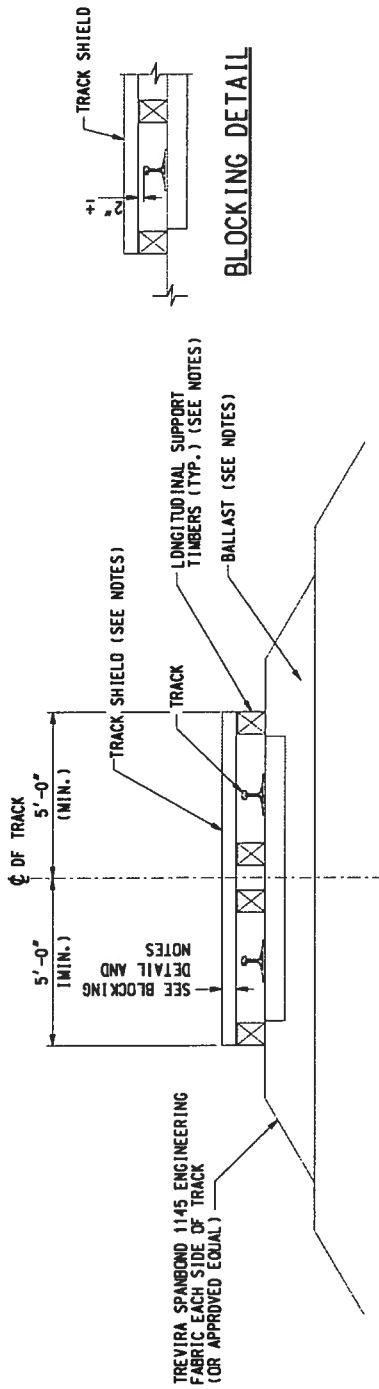
BRIDGE DECK CROSS SECTION STANDARD LIMITS OF PROTECTION



DEMOLITION FRAME
PROTECTION DETAILS

* IF NO ACCESS ROAD, USE MIN. DIMENSION FROM OTHER SIDE

DATE: OCTOBER 17, 2007 SHEET: 2 OF 3



TRACK SHIELD DETAIL **FOR DEBRIS FALLING FROM BRIDGE DECK REMOVAL** **(WHEN TRACK TIME WINDOW IS AVAILABLE)**

NOTES:

1. A FLAG MAN IS REQUIRED AT ALL TIMES DURING THE USE OF A TRACK SHIELD.
2. THE TRACK SHIELD SHALL BE DESIGNED BY THE CONTRACTOR AND SHALL BE OF SUFFICIENT STRENGTH TO SUPPORT THE ANTICIPATED LOADS, INCLUDING IMPACT AND PUNCTURE. THE SHIELD SHALL PREVENT MATERIALS AND EQUIPMENT OR DEBRIS FROM FALLING ONTO THE RAILROAD TRACK. ADDITIONAL LAYERS OF MATERIALS SHALL BE FURNISHED AS NECESSARY TO PREVENT FINE MATERIALS OR DEBRIS FROM SIFTING DOWN UPON THE TRACK.
3. THE SHIELD SHALL BE PREFABRICATED AND FURNISHED WITH LIFTING HOOKS TO SIMPLIFY REMOVAL.
4. THE SHIELD SHALL BE OF SUFFICIENT STRENGTH TO SPAN BETWEEN IT'S SUPPORTS WITHOUT BEARING UPON THE RAILS AND TO WITHSTAND DROPPING RUBBLE.
5. BEFORE REMOVAL THE SHIELD SHALL BE CLEANED OF ALL DEBRIS AND FINE MATERIAL. GEOFABRIC SHALL LINE THE BALLAST SECTION TO PREVENT CONTAMINATION.
6. THE TRACK SHIELD SHALL EXTEND AT LEAST 20 FEET BEYOND THE LIMITS OF DEMOLITION TRANSVERSE TO THE EDGE OF THE BRIDGE.
7. LONGITUDINAL SUPPORT TIMBERS FOR THE SHIELD SHALL NOT EXTEND ABOVE THE TOP OF RAIL WHEN THE SHIELD IS REMOVED. BLOCKING FROM THE TOP OF RAIL TO THE BOTTOM OF THE SHIELD MAY BE ATTACHED TO THE SHIELD. REMAINING TIMBERS SHALL BE ANCHORED.
8. FOR TRAIN PASSAGE, THE RUBBLE SHALL BE REMOVED TO A MINIMUM OF 8'-6" FROM THE NEAREST RAIL AND TO AN ELEVATION NO HIGHER THAN THE TOP OF RAIL.
9. AT THE END OF THE DAY, THE RUBBLE SHALL BE REMOVED COMPLETELY TO A MINIMUM OF 10'-0" FROM THE NEAREST RAIL AND DOWN TO ORIGINAL GRADE. GEOFABRIC BARRIER SHALL BE USED TO PREVENT BALLAST CONTAMINATION BY FINE MATERIALS.
10. CARE SHALL BE TAKEN TO NOT PLACE METAL ACROSS THE TRACK RAILS. RAILROAD COMMUNICATION ARE SENT THROUGH THE RAILS AND WILL BE DISRUPTED BY A SHORT BETWEEN RAILS.
11. DETAILS SHOWN APPLY FOR TIMBER TIES. SPECIAL DETAILS ARE REQUIRED FOR CONCRETE TIES.



DEMOLITION TRACK SHIELD DETAIL

DATE: OCTOBER 17, 2007 SHEET: 3 OF 3

SECTION 14. FEDERAL REQUIREMENTS FOR FEDERAL-AID CONSTRUCTION PROJECTS

SECTION 14. FEDERAL REQUIREMENTS FOR FEDERAL-AID CONSTRUCTION PROJECTS

GENERAL.—The work herein proposed will be financed in whole or in part with Federal funds, and therefore all of the statutes, rules and regulations promulgated by the Federal Government and applicable to work financed in whole or in part with Federal funds will apply to such work. The "Required Contract Provisions, Federal-Aid Construction Contracts, "Form FHWA 1273, are included in this Section 14. Whenever in said required contract provisions references are made to "SHA contracting officer," "SHA resident engineer," or "authorized representative of the SHA," such references shall be construed to mean "Engineer" as defined in Section 1-1.18 of the Standard Specifications.

PERFORMANCE OF PREVIOUS CONTRACT.—In addition to the provisions in Section II, "Nondiscrimination," and Section VII, "Subletting or Assigning the Contract," of the required contract provisions, the Contractor shall comply with the following:

The bidder shall execute the CERTIFICATION WITH REGARD TO THE PERFORMANCE OF PREVIOUS CONTRACTS OR SUBCONTRACTS SUBJECT TO THE EQUAL OPPORTUNITY CLAUSE AND THE FILING OF REQUIRED REPORTS located in the proposal. No request for subletting or assigning any portion of the contract in excess of \$10,000 will be considered under the provisions of Section VII of the required contract provisions unless such request is accompanied by the CERTIFICATION referred to above, executed by the proposed subcontractor.

NON-COLLUSION PROVISION.—The provisions in this section are applicable to all contracts except contracts for Federal Aid Secondary projects.

Title 23, United States Code, Section 112, requires as a condition precedent to approval by the Federal Highway Administrator of the contract for this work that each bidder file a sworn statement executed by, or on behalf of, the person, firm, association, or corporation to whom such contract is to be awarded, certifying that such person, firm, association, or corporation has not, either directly or indirectly, entered into any agreement, participated in any collusion, or otherwise taken any action in restraint of free competitive bidding in connection with the submitted bid. A form to make the non-collusion affidavit statement required by Section 112 as a certification under penalty of perjury rather than as a sworn statement as permitted by 28, USC, Sec. 1746, is included in the proposal.

PARTICIPATION BY DISADVANTAGED BUSINESS ENTERPRISES IN SUBCONTRACTING.—Part 26, Title 49, Code of Federal Regulations applies to this Federal-aid project. Pertinent sections of said Code are incorporated in part or in its entirety within other sections of these special provisions.

Schedule B—Information for Determining Joint Venture Eligibility

(This form need not be filled in if all joint venture firms are DBE owned.)

1. Name of joint venture _____

2. Address of joint venture _____

3. Phone number of joint venture _____

4. Identify the firms which comprise the joint venture. (The DBE partner must complete Schedule A.) _____

a. Describe the role of the DBE firm in the joint venture. _____

b. Describe very briefly the experience and business qualifications of each non-DBE joint venturer: _____

5. Nature of the joint venture's business _____

6. Provide a copy of the joint venture agreement.

7. What is the claimed percentage of DBE ownership? _____

8. Ownership of joint venture: (This need not be filled in if described in the joint venture agreement, provided by question 6.).

Revised 3-95
08-07-95

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**REQUIRED CONTRACT PROVISIONS
FEDERAL-AID CONSTRUCTION CONTRACTS**

(Exclusive of Appalachian Contracts)

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ATTACHMENTS

A. Employment Preference for Appalachian Contracts (included in Appalachian contracts only)

I. GENERAL

1. These contract provisions shall apply to all work performed on the contract by the contractor's own organization and with the assistance of workers under the contractor's immediate superintendence and to all work performed on the contract by piecework, station work, or by subcontract.

2. Except as otherwise provided for in each section, the contractor shall insert in each subcontract all of the stipulations contained in these Required Contract Provisions, and further require their inclusion in any lower tier subcontract or purchase order that may in turn be made. The Required Contract Provisions shall not be incorporated by reference in any case. The prime contractor shall be responsible for compliance by any subcontractor or lower tier subcontractor with these Required Contract Provisions.

3. A breach of any of the stipulations contained in these Required Contract Provisions shall be sufficient grounds for termination of the contract.

4. A breach of the following clauses of the Required Contract Provisions may also be grounds for debarment as provided in 29 CFR 5.12:

Section I, paragraph 2;
Section IV, paragraphs 1, 2, 3, 4, and 7;
Section V, paragraphs 1 and 2a through 2g.

5. Disputes arising out of the labor standards provisions of Section IV (except paragraph 5) and Section V of these Required Contract Provisions shall not be subject to the general disputes clause of this contract. Such disputes shall be resolved in accordance with the procedures of the U.S. Department of Labor (DOL) as set forth in 29 CFR 5, 6, and 7. Disputes within the meaning of this clause include disputes between the contractor (or any of its subcontractors) and the contracting agency, the DOL, or the contractor's employees or their representatives.

6. Selection of Labor: During the performance of this contract, the contractor shall not:

a. discriminate against labor from any other State, possession, or territory of the United States (except for employment preference for Appalachian contracts, when applicable, as specified in Attachment A), or

b. employ convict labor for any purpose within the limits of the project unless it is labor performed by convicts who are on parole, supervised release, or probation.

II. NONDISCRIMINATION

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

1. Equal Employment Opportunity: Equal employment opportunity (EEO) requirements not to discriminate and to take affirmative action to assure equal opportunity as set forth under laws, executive orders, rules, regulations (28 CFR 35, 29 CFR 1630, and 41 CFR 60) and orders of the Secretary of Labor as modified by the provisions prescribed herein, and imposed pursuant to 23 U.S.C. 140 shall constitute the EEO and specific affirmative action standards for the contractor's project activities under this contract. The Equal Opportunity Construction Contract Specifications set forth under 41 CFR 60-4.3 and the provisions of the American Disabilities Act of 1990 (42 U.S.C. 12101 et seq.) set forth under 28 CFR 35 and 29 CFR 1630 are incorporated by reference in this contract. In the execution of this contract, the contractor agrees to comply with the following minimum specific requirement activities of EEO:

a. The contractor will work with the State highway agency (SHA) and the Federal Government in carrying out EEO obligations and in their review of his/her activities under the contract.

b. The contractor will accept as his operating policy the following statement:

"It is the policy of this Company to assure that applicants are employed, and that employees are treated during employment, without regard to their race, religion, sex, color, national origin, age or disability. Such action shall include: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship, preapprenticeship, and/or on-the-job training."

2. EEO Officer: The contractor will designate and make known to the SHA contracting officers an EEO Officer who will have the responsibility for and must be capable of effectively

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administering and promoting an active contractor program of EEO and who must be assigned adequate authority and responsibility to do so.

3. Dissemination of Policy: All members of the contractor's staff who are authorized to hire, supervise, promote, and discharge employees, or who recommend such action, or who are substantially involved in such action, will be made fully cognizant of, and will implement, the contractor's EEO policy and contractual responsibilities to provide EEO in each grade and classification of employment. To ensure that the above agreement will be met, the following actions will be taken as a minimum:

a. Periodic meetings of supervisory and personnel office employees will be conducted before the start of work and then not less often than once every six months, at which time the contractor's EEO policy and its implementation will be reviewed and explained. The meetings will be conducted by the EEO Officer.

b. All new supervisory or personnel office employees will be given a thorough indoctrination by the EEO Officer, covering all major aspects of the contractor's EEO obligations within thirty days following their reporting for duty with the contractor.

c. All personnel who are engaged in direct recruitment for the project will be instructed by the EEO Officer in the contractor's procedures for locating and hiring minority group employees.

d. Notices and posters setting forth the contractor's EEO policy will be placed in areas readily accessible to employees, applicants for employment and potential employees.

e. The contractor's EEO policy and the procedures to implement such policy will be brought to the attention of employees by means of meetings, employee handbooks, or other appropriate means.

4. Recruitment: When advertising for employees, the contractor will include in all advertisements for employees the notation: "An Equal Opportunity Employer." All such advertisements will be placed in publications having a large circulation among minority groups in the area from which the project work force would normally be derived.

a. The contractor will, unless precluded by a valid bargaining agreement, conduct systematic and direct recruitment through public and private employee referral sources likely to yield qualified minority group applicants. To meet this requirement, the contractor will identify sources of potential minority group employees, and establish with such identified sources procedures whereby minority group applicants may be referred to the contractor for employment consideration.

b. In the event the contractor has a valid bargaining agreement providing for exclusive hiring hall referrals, he is expected to observe the provisions of that agreement to the extent that the system permits the contractor's compliance with EEO contract provisions. (The DOL has held that where implementation of such agreements have the effect of discriminating against minorities or women, or obligates the contractor to do the same, such implementation violates Executive Order 11246, as amended.)

c. The contractor will encourage his present employees to refer minority group applicants for employment. Information and procedures with regard to referring minority group applicants will be discussed with employees.

5. Personnel Actions: Wages, working conditions, and employee benefits shall be established and administered, and personnel actions of every type, including hiring, upgrading, promotion, transfer, demotion, layoff, and termination, shall be taken without regard to race, color, religion, sex, national origin, age or disability. The following procedures shall be followed:

a. The contractor will conduct periodic inspections of project sites to ensure that working conditions and employee facilities do not indicate discriminatory treatment of project site personnel.

b. The contractor will periodically evaluate the spread of wages paid within each classification to determine any evidence of discriminatory wage practices.

c. The contractor will periodically review selected personnel actions in depth to determine whether there is evidence of discrimination. Where evidence is found, the contractor will promptly take corrective action. If the review indicates that the discrimination may extend beyond the actions reviewed, such corrective action shall include all affected persons.

d. The contractor will promptly investigate all complaints of alleged discrimination made to the contractor in connection with his obligations under this contract, will attempt to resolve such complaints, and will take appropriate corrective action within a reasonable time. If the investigation indicates that the discrimination may affect persons other than the complainant, such corrective action shall include such other persons. Upon completion of each investigation, the contractor will inform every complainant of all of his avenues of appeal.

6. Training and Promotion:

a. The contractor will assist in locating, qualifying, and increasing the skills of minority group and women employees, and applicants for employment.

b. Consistent with the contractor's work force requirements and as permissible under Federal and State regulations, the contractor shall make full use of training programs, i.e., apprenticeship, and on-the-job training programs for the geographical area of contract performance. Where feasible, 25 percent of apprentices or trainees in each occupation shall be in their first year of apprenticeship or training. In the event a special provision for training is provided under this contract, this subparagraph will be superseded as indicated in the special provision.

c. The contractor will advise employees and applicants for employment of available training programs and entrance requirements for each.

d. The contractor will periodically review the training and promotion potential of minority group and women employees and will encourage eligible employees to apply for such training and promotion.

7. Unions: If the contractor relies in whole or in part upon unions as a source of employees, the contractor will use his/her best efforts to obtain the cooperation of such unions to increase opportunities for minority groups and women within the unions, and to effect referrals by such unions of minority and female employees. Actions by the contractor either directly or through a contractor's association acting as agent will include the procedures set forth below:

a. The contractor will use best efforts to develop, in cooperation with the unions, joint training programs aimed toward qualifying more minority group members and women for membership in the unions and increasing the skills of minority group employees and women so that they may qualify for higher paying employment.

b. The contractor will use best efforts to incorporate an EEO clause into each union agreement to the end that such union will be contractually bound to refer applicants without regard to their race, color, religion, sex, national origin, age or disability.

c. The contractor is to obtain information as to the referral practices and policies of the labor union except that to the extent such information is within the exclusive possession of the labor union and such labor union refuses to furnish such information to the contractor, the contractor shall so certify to the SHA and shall set forth what efforts have been made to obtain such information.

d. In the event the union is unable to provide the contractor with a reasonable flow of minority and women referrals within the time limit set forth in the collective bargaining agreement, the contractor will, through independent recruitment efforts, fill the employment vacancies without regard to race, color, religion, sex, national origin, age or disability; making full efforts to obtain qualified and/or qualifiable minority group persons and women. (The DOL has held that it shall be no excuse that the union with which the contractor has a collective bargaining agreement providing for exclusive referral failed to refer minority employees.) In the event the union referral practice prevents the contractor from meeting the obligations pursuant to Executive Order 11246, as amended, and these special provisions, such contractor shall immediately notify the SHA.

8. Selection of Subcontractors, Procurement of Materials and Leasing of Equipment: The contractor shall not discriminate on the grounds of race, color, religion, sex, national origin, age or disability in the selection and retention of subcontractors, including procurement of materials and leases of equipment.

a. The contractor shall notify all potential subcontractors and suppliers of his/her EEO obligations under this contract.

b. Disadvantaged business enterprises (DBE), as defined in 49 CFR 26, shall have equal opportunity to compete for and perform subcontracts which the contractor enters into pursuant to this contract. The contractor will use his best efforts to solicit bids from and to utilize DBE subcontractors or subcontractors with meaningful minority group and female representation among their employees. Contractors shall obtain lists of DBE construction firms from SHA personnel.

c. The contractor will use his best efforts to ensure subcontractor compliance with their EEO obligations.

9. Records and Reports: The contractor shall keep such

records as necessary to document compliance with the EEO requirements. Such records shall be retained for a period of three years following completion of the contract work and shall be available at reasonable times and places for inspection by authorized representatives of the SHA and the FHWA.

a. The records kept by the contractor shall document the following:

(1) The number of minority and non-minority group members and women employed in each work classification on the project;

(2) The progress and efforts being made in cooperation with unions, when applicable, to increase employment opportunities for minorities and women;

(3) The progress and efforts being made in locating, hiring, training, qualifying, and upgrading minority and female employees; and

(4) The progress and efforts being made in securing the services of DBE subcontractors or subcontractors with meaningful minority and female representation among their employees.

b. The contractors will submit an annual report to the SHA each July for the duration of the project, indicating the number of minority, women, and non-minority group employees currently engaged in each work classification required by the contract work. This information is to be reported on Form FHWA-1391. If on-the-job training is being required by special provision, the contractor will be required to collect and report training data.

III NONSEGREGATED FACILITIES

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$10,000 or more.)

a. By submission of this bid, the execution of this contract or subcontract, or the consummation of this material supply agreement or purchase order, as appropriate, the bidder, Federal-aid construction contractor, subcontractor, material supplier, or vendor, as appropriate, certifies that the firm does not maintain or provide for its employees any segregated facilities at any of its establishments, and that the firm does not permit its employees to perform their services at any location, under its control, where segregated facilities are maintained. The firm agrees that a breach of this certification is a violation of the EEO provisions of this contract. The firm further certifies that no employee will be denied access to adequate facilities on the basis of sex or disability.

b. As used in this certification, the term "segregated facilities" means any waiting rooms, work areas, restrooms and washrooms, restaurants and other eating areas, time clocks, locker rooms, and other storage or dressing areas, parking lots, drinking fountains, recreation or entertainment areas, transportation, and housing facilities provided for employees which are segregated by explicit directive, or are, in fact, segregated on the basis of race, color, religion, national origin, age or disability, because of habit, local custom, or otherwise. The only exception will be for the disabled when the demands for accessibility override (e.g. disabled parking).

c. The contractor agrees that it has obtained or will obtain identical certification from proposed subcontractors or material suppliers prior to award of subcontracts or consummation of material supply agreements of \$10,000 or more and that it will retain such certifications in its files.

IV. PAYMENT OF PREDETERMINED MINIMUM WAGE

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural minor collectors, which are exempt.)

1. General:

a. All mechanics and laborers employed or working upon the site of the work will be paid unconditionally and not less often than once a week and without subsequent deduction or rebate on any account [except such payroll deductions as are permitted by regulations (29 CFR 3)] issued by the Secretary of Labor under the Copeland Act (40 U.S.C. 276c) the full amounts of wages and bona fide fringe benefits (or cash equivalents thereof) due at time of payment. The payment shall be computed at wage rates not less than those contained in the wage determination of the Secretary of Labor (hereinafter "the wage determination") which is attached hereto and made a part hereof, regardless of any contractual relationship which may be alleged to exist between the contractor or its subcontractors and such laborers and mechanics. The wage determination (including any additional classifications and wage rates conformed under paragraph 2 of this Section IV and the DOL poster (WH-1321) or Form FHWA-1495) shall be posted at all times by the contractor and its subcontractors at the site of the work in a prominent and accessible place where it can be easily seen by the workers. For the purpose of this Section, contributions made or costs reasonably anticipated for bona fide fringe benefits under Section 1(b)(2) of the Davis-Bacon Act (40 U.S.C. 276a) on behalf of laborers or mechanics are considered wages paid to such laborers or mechanics, subject to the provisions of Section IV, paragraph 3b, hereof. Also, for the purpose of this Section, regular contributions made or costs incurred for more than a weekly period (but not less often than quarterly) under plans, funds, or programs, which cover the particular weekly period, are deemed to be constructively made or incurred during such weekly period. Such laborers and mechanics shall be paid the appropriate wage rate and fringe benefits on the wage determination for the classification of work actually performed, without regard to skill, except as provided in paragraphs 4 and 5 of this Section IV.

b. Laborers or mechanics performing work in more than one classification may be compensated at the rate specified for each classification for the time actually worked therein, provided, that the employer's payroll records accurately set forth the time spent in each classification in which work is performed.

c. All rulings and interpretations of the Davis-Bacon Act and related acts contained in 29 CFR 1, 3, and 5 are herein incorporated by reference in this contract.

2. Classification:

a. The SHA contracting officer shall require that any class of laborers or mechanics employed under the contract, which is not listed in the wage determination, shall be classified in conformance with the wage determination.

b. The contracting officer shall approve an additional classification, wage rate and fringe benefits only when the following criteria have been met:

(1) the work to be performed by the additional classification requested is not performed by a classification in the wage determination;

(2) the additional classification is utilized in the area by the construction industry;

(3) the proposed wage rate, including any bona fide fringe benefits, bears a reasonable relationship to the wage rates contained in the wage determination; and

(4) with respect to helpers, when such a classification prevails in the area in which the work is performed.

c. If the contractor or subcontractors, as appropriate, the laborers and mechanics (if known) to be employed in the additional classification or their representatives, and the contracting officer agree on the classification and wage rate (including the amount designated for fringe benefits where appropriate), a report of the action taken shall be sent by the contracting officer to the DOL, Administrator of the Wage and Hour Division, Employment Standards Administration, Washington, D.C. 20210. The Wage and Hour Administrator, or an authorized representative, will approve, modify, or disapprove every additional classification action within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

d. In the event the contractor or subcontractors, as appropriate, the laborers or mechanics to be employed in the additional classification or their representatives, and the contracting officer do not agree on the proposed classification and wage rate (including the amount designated for fringe benefits, where appropriate), the contracting officer shall refer the questions, including the views of all interested parties and the recommendation of the contracting officer, to the Wage and Hour Administrator for determination. Said Administrator, or an authorized representative, will issue a determination within 30 days of receipt and so advise the contracting officer or will notify the contracting officer within the 30-day period that additional time is necessary.

e. The wage rate (including fringe benefits where appropriate) determined pursuant to paragraph 2c or 2d of this Section IV shall be paid to all workers performing work in the additional classification from the first day on which work is performed in the classification.

3. Payment of Fringe Benefits:

a. Whenever the minimum wage rate prescribed in the contract for a class of laborers or mechanics includes a fringe benefit which is not expressed as an hourly rate, the contractor or subcontractors, as appropriate, shall either pay the benefit

as stated in the wage determination or shall pay another bona fide fringe benefit or an hourly case equivalent thereof.

b. If the contractor or subcontractor, as appropriate, does not make payments to a trustee or other third person, he/she may consider as a part of the wages of any laborer or mechanic the amount of any costs reasonably anticipated in providing bona fide fringe benefits under a plan or program, provided, that the Secretary of Labor has found, upon the written request of the contractor, that the applicable standards of the Davis-Bacon Act have been met. The Secretary of Labor may require the contractor to set aside in a separate account assets for the meeting of obligations under the plan or program.

4. Apprentices and Trainees (Programs of the U.S. DOL) and Helpers:

a. Apprentices:

(1) Apprentices will be permitted to work at less than the predetermined rate for the work they performed when they are employed pursuant to and individually registered in a bona fide apprenticeship program registered with the DOL, Employment and Training Administration, Bureau of Apprenticeship and Training, or with a State apprenticeship agency recognized by the Bureau, or if a person is employed in his/her first 90 days of probationary employment as an apprentice in such an apprenticeship program, who is not individually registered in the program, but who has been certified by the Bureau of Apprenticeship and Training or a State apprenticeship agency (where appropriate) to be eligible for probationary employment as an apprentice.

(2) The allowable ratio of apprentices to journeyman-level employees on the job site in any craft classification shall not be greater than the ratio permitted to the contractor as to the entire work force under the registered program. Any employee listed on a payroll at an apprentice wage rate, who is not registered or otherwise employed as stated above, shall be paid not less than the applicable wage rate listed in the wage determination for the classification of work actually performed. In addition, any apprentice performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed. Where a contractor or subcontractor is performing construction on a project in a locality other than that in which its program is registered, the ratios and wage rates (expressed in percentages of the journeyman-level hourly rate) specified in the contractor's or subcontractor's registered program shall be observed.

(3) Every apprentice must be paid at not less than the rate specified in the registered program for the apprentice's level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Apprentices shall be paid fringe benefits in accordance with the provisions of the apprenticeship program. If the apprenticeship program does not specify fringe benefits, apprentices must be paid the full amount of fringe benefits listed on the wage determination for the applicable classification. If the Administrator for the Wage and Hour Division determines that a different practice prevails for the applicable apprentice classification, fringes shall be paid in accordance with that determination.

(4) In the event the Bureau of Apprenticeship and Training, or a State apprenticeship agency recognized by the Bureau, withdraws approval of an apprenticeship program, the contractor or subcontractor will no longer be permitted to utilize apprentices at less than the applicable predetermined rate for the comparable work performed by regular employees until an acceptable program is approved.

b. Trainees:

(1) Except as provided in 29 CFR 5.16, trainees will not be permitted to work at less than the predetermined rate for the work performed unless they are employed pursuant to and individually registered in a program which has received prior approval, evidenced by formal certification by the DOL, Employment and Training Administration.

(2) The ratio of trainees to journeyman-level employees on the job site shall not be greater than permitted under the plan approved by the Employment and Training Administration. Any employee listed on the payroll at a trainee rate who is not registered and participating in a training plan approved by the Employment and Training Administration shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed. In addition, any trainee performing work on the job site in excess of the ratio permitted under the registered program shall be paid not less than the applicable wage rate on the wage determination for the work actually performed.

(3) Every trainee must be paid at not less than the rate specified in the approved program for his/her level of progress, expressed as a percentage of the journeyman-level hourly rate specified in the applicable wage determination. Trainees shall be paid fringe benefits in accordance with the provisions of the trainee program. If the trainee program does not mention fringe benefits, trainees shall be paid the full amount of fringe benefits listed on the wage determination unless the Administrator of the Wage and Hour Division determines that there is an apprenticeship program associated with the corresponding journeyman-level wage rate on the wage determination which provides for less than full fringe benefits for apprentices, in which case such trainees shall receive the same fringe benefits as apprentices.

(4) In the event the Employment and Training Administration withdraws approval of a training program, the contractor or subcontractor will no longer be permitted to utilize trainees at less than the applicable predetermined rate for the work performed until an acceptable program is approved.

c. Helpers:

Helpers will be permitted to work on a project if the helper classification is specified and defined on the applicable wage determination or is approved pursuant to the conformance procedure set forth in Section IV.2. Any worker listed on a payroll at a helper wage rate, who is not a helper under an approved definition, shall be paid not less than the applicable wage rate on the wage determination for the classification of work actually performed.

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5. Apprentices and Trainees (Programs of the U.S. DOT):

Apprentices and trainees working under apprenticeship and skill training programs which have been certified by the Secretary of Transportation as promoting EEO in connection with Federal-aid highway construction programs are not subject to the requirements of paragraph 4 of this Section IV. The straight time hourly wage rates for apprentices and trainees under such programs will be established by the particular programs. The ratio of apprentices and trainees to journeymen shall not be greater than permitted by the terms of the particular program.

6. Withholding:

The SHA shall upon its own action or upon written request of an authorized representative of the DOL withhold, or cause to be withheld, from the contractor or subcontractor under this contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to Davis-Bacon prevailing wage requirements which is held by the same prime contractor, as much of the accrued payments or advances as may be considered necessary to pay laborers and mechanics, including apprentices, trainees, and helpers, employed by the contractor or any subcontractor the full amount of wages required by the contract. In the event of failure to pay any laborer or mechanic, including any apprentice, trainee, or helper, employed or working on the site of the work, all or part of the wages required by the contract, the SHA contracting officer may, after written notice to the contractor, take such action as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds until such violations have ceased.

7. Overtime Requirements:

No contractor or subcontractor contracting for any part of the contract work which may require or involve the employment of laborers, mechanics, watchmen, or guards (including apprentices, trainees, and helpers described in paragraphs 4 and 5 above) shall require or permit any laborer, mechanic, watchman, or guard in any workweek in which he/she is employed on such work, to work in excess of 40 hours in such workweek unless such laborer, mechanic, watchman, or guard receives compensation at a rate not less than one-and-one-half times his/her basic rate of pay for all hours worked in excess of 40 hours in such workweek.

8. Violation:

Liability for Unpaid Wages; Liquidated Damages: In the event of any violation of the clause set forth in paragraph 7 above, the contractor and any subcontractor responsible thereof shall be liable to the affected employee for his/her unpaid wages. In addition, such contractor and subcontractor shall be liable to the United States (in the case of work done under contract for the District of Columbia or a territory, to such District or to such territory) for liquidated damages. Such liquidated damages shall be computed with respect to each individual laborer, mechanic, watchman, or guard employed in violation of the clause set forth in paragraph 7, in the sum of \$10 for each calendar day on which such employee was required or permitted to work in excess of the standard work week of 40 hours without payment of the overtime wages required by the clause set forth in paragraph 7.

9. Withholding for Unpaid Wages and Liquidated Damages:

The SHA shall upon its own action or upon written request of any authorized representative of the DOL withhold, or cause to be withheld, from any moneys payable on account of work performed by the contractor or subcontractor under any such contract or any other Federal contract with the same prime contractor, or any other federally-assisted contract subject to the Contract Work Hours and Safety Standards Act, which is held by the same prime contractor, such sums as may be determined to be necessary to satisfy any liabilities of such contractor or subcontractor for unpaid wages and liquidated damages as provided in the clause set forth in paragraph 8 above.

V. STATEMENTS AND PAYROLLS

(Applicable to all Federal-aid construction contracts exceeding \$2,000 and to all related subcontracts, except for projects located on roadways classified as local roads or rural collectors, which are exempt.)

1. Compliance with Copeland Regulations (29 CFR 3):

The contractor shall comply with the Copeland Regulations of the Secretary of Labor which are herein incorporated by reference.

2. Payrolls and Payroll Records:

a. Payrolls and basic records relating thereto shall be maintained by the contractor and each subcontractor during the course of the work and preserved for a period of 3 years from the date of completion of the contract for all laborers, mechanics, apprentices, trainees, watchmen, helpers, and guards working at the site of the work.

b. The payroll records shall contain the name, social security number, and address of each such employee; his or her correct classification; hourly rates of wages paid (including rates of contributions or costs anticipated for bona fide fringe benefits or cash equivalent thereof of the types described in Section 1(b)(2)(B) of the Davis Bacon Act); daily and weekly number of hours worked; deductions made; and actual wages paid. In addition, for Appalachian contracts, the payroll records shall contain a notation indicating whether the employee does, or does not, normally reside in the labor area as defined in Attachment A, paragraph 1. Whenever the Secretary of Labor, pursuant to Section IV, paragraph 3b, has found that the wages of any laborer or mechanic include the amount of any costs reasonably anticipated in providing benefits under a plan or program described in Section 1(b)(2)(B) of the Davis Bacon Act, the contractor and each subcontractor shall maintain records which show that the commitment to provide such benefits is enforceable, that the plan or program is financially responsible, that the plan or program has been communicated in writing to the laborers or mechanics affected, and show the cost anticipated or the actual cost incurred in providing benefits. Contractors or subcontractors employing apprentices or trainees under approved programs shall maintain written evidence of the registration of apprentices and trainees, and ratios and wage rates prescribed in the applicable programs.

c. Each contractor and subcontractor shall furnish, each week in which any contract work is performed, to the SHA resident engineer a payroll of wages paid each of its employees (including apprentices, trainees, and helpers, described in Section IV, paragraphs 4 and 5, and watchmen and guards engaged on work during the preceding weekly payroll period). The payroll submitted shall set out accurately and completely all of the information required to be maintained under paragraph 2b of this Section V. This information may be submitted in any form desired. Optional Form WH-347 is available for this purpose and may be purchased from the Superintendent of Documents (Federal stock number 029-005-0014-1), U.S. Government Printing Office, Washington, D.C. 20402. The prime contractor is responsible for the submission of copies of payrolls by all subcontractors.

d. Each payroll submitted shall be accompanied by a "Statement of Compliance," signed by the contractor or subcontractor or his/her agent who pays or supervises the payment of the persons employed under the contract and shall certify the following:

(1) that the payroll for the payroll period contains the information required to be maintained under paragraph 2b of this Section V and that such information is correct and complete;

(2) that such laborer or mechanic (including each helper, apprentice, and trainee) employed on the contract during the payroll period has been paid the full weekly wages earned, without rebate, either directly or indirectly, and that no deductions have been made either directly or indirectly from the full wages earned, other than permissible deductions as set forth in the Regulations, 29 CFR 3;

(3) that each laborer or mechanic has been paid not less than the applicable wage rate and fringe benefits or cash equivalent for the classification of work performed, as specified in the applicable wage determination incorporated into the contract.

e. The weekly submission of a properly executed certification set forth on the reverse side of Optional Form WH-347 shall satisfy the requirement for submission of the "Statement of Compliance" required by paragraph 2d of this Section V.

f. The falsification of any of the above certifications may subject the contractor to civil or criminal prosecution under 18 U.S.C. 1001 and 31 U.S.C. 231.

g. The contractor or subcontractor shall make the records required under paragraph 2b of this Section V available for inspection, copying, or transcription by authorized representatives of the SHA, the FHWA, or the DOL, and shall permit such representatives to interview employees during working hours on the job. If the contractor or subcontractor fails to submit the required records or to make them available, the SHA, the FHWA, the DOL, or all may, after written notice to the contractor, sponsor, applicant, or owner, take such actions as may be necessary to cause the suspension of any further payment, advance, or guarantee of funds. Furthermore, failure to submit the required records upon request or to make such records available

may be grounds for debarment action pursuant to 29 CFR 5.12.

VI. RECORD OF MATERIALS, SUPPLIES, AND LABOR

1. On all Federal-aid contracts on the National Highway System, except those which provide solely for the installation of protective devices at railroad grade crossings, those which are constructed on a force account or direct labor basis, highway beautification contracts, and contracts for which the total final construction cost for roadway and bridge is less than \$1,000,000 (23 CFR 635); the contractor shall:

a. Become familiar with the list of specific materials and supplies contained in Form FHWA-47, "Statement of Materials and Labor Used by Contractor of Highway Construction Involving Federal Funds," prior to the commencement of work under this contract.

b. Maintain a record of the total cost of all materials and supplies purchased for and incorporated in the work, and also of the quantities of those specific materials and supplies listed on Form FHWA-47, and in the units shown on Form FHWA-47.

c. Furnish, upon the completion of the contract, to the SHA resident engineer on Form FHWA-47 together with the data required in paragraph 1b relative to materials and supplies, a final labor summary of all contract work indicating the total hours worked and the total amount earned.

2. At the prime contractor's option, either a single report covering all contract work or separate reports for the contractor and for each subcontract shall be submitted.

VII. SUBLETTING OR ASSIGNING THE CONTRACT

1. The contractor shall perform with its own organization contract work amounting to not less than 30 percent (or a greater percentage if specified elsewhere in the contract) of the total original contract price, excluding any specialty items designated by the State. Specialty items may be performed by subcontract and the amount of any such specialty items performed may be deducted from the total original contract price before computing the amount of work required to be performed by the contractor's own organization (23 CFR 635).

a. "Its own organization" shall be construed to include only workers employed and paid directly by the prime contractor and equipment owned or rented by the prime contractor, with or without operators. Such term does not include employees or equipment of a subcontractor, assignee, or agent of the prime contractor.

b. "Specialty Items" shall be construed to be limited to work that requires highly specialized knowledge, abilities, or equipment not ordinarily available in the type of contracting organizations qualified and expected to bid on the contract as a whole and in general are to be limited to minor components of the overall contract.

2. The contract amount upon which the requirements set forth in paragraph 1 of Section VII is computed includes the cost of material and manufactured products which are to be purchased or produced by the contractor under the contract provisions.

3. The contractor shall furnish (a) a competent superintendent or supervisor who is employed by the firm, has full authority to direct performance of the work in accordance with the contract requirements, and is in charge of all construction operations (regardless of who performs the work) and (b) such other of its own organizational resources (supervision, management, and engineering services) as the SHA contracting officer determines is necessary to assure the performance of the contract.

4. No portion of the contract shall be sublet, assigned or otherwise disposed of except with the written consent of the SHA contracting officer, or authorized representative, and such consent when given shall not be construed to relieve the contractor of any responsibility for the fulfillment of the contract. Written consent will be given only after the SHA has assured that each subcontract is evidenced in writing and that it contains all pertinent provisions and requirements of the prime contract.

VIII. SAFETY: ACCIDENT PREVENTION

1. In the performance of this contract the contractor shall comply with all applicable Federal, State, and local laws governing safety, health, and sanitation (23 CFR 635). The contractor shall provide all safeguards, safety devices and protective equipment and take any other needed actions as it determines, or as the SHA contracting officer may determine, to be reasonably necessary to protect the life and health of employees on the job and the safety of the public and to protect property in connection with the performance of the work covered by the contract.

2. It is a condition of this contract, and shall be made a condition of each subcontract, which the contractor enters into pursuant to this contract, that the contractor and any subcontractor shall not permit any employee, in performance of the contract, to work in surroundings or under conditions which are unsanitary, hazardous or dangerous to his/her health or safety, as determined under construction safety and health standards (29 CFR 1926) promulgated by the Secretary of Labor, in accordance with Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

3. Pursuant to 29 CFR 1926.3, it is a condition of this contract that the Secretary of Labor or authorized representative thereof, shall have right of entry to any site of contract performance to inspect or investigate the matter of compliance with the construction safety and health standards and to carry out the duties of the Secretary under Section 107 of the Contract Work Hours and Safety Standards Act (40 U.S.C. 333).

IX. FALSE STATEMENTS CONCERNING HIGHWAY PROJECTS

In order to assure high quality and durable construction in conformity with approved plans and specifications and a high degree of reliability on statements and representations made by engineers, contractors, suppliers, and workers on Federal-aid highway projects, it is essential that all persons concerned with the project perform their functions as carefully, thoroughly, and honestly as possible. Willful falsification, distortion, or misrepresentation with respect to any facts related to the project is a violation of Federal law. To prevent any misunderstanding refer Form 1273 — Revised 3-95
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garding the seriousness of these and similar acts, the following notice shall be posted on each Federal-aid highway project (23 CFR 635) in one or more places where it is readily available to all persons concerned with the project:

NOTICE TO ALL PERSONNEL ENGAGED ON FEDERAL-AID HIGHWAY PROJECTS

18 U.S.C. 1020 reads as follows:

"Whoever being an officer, agent, or employee of the United States, or any State or Territory, or whoever, whether a person, association, firm, or corporation, knowingly makes any false statement, false representation, or false report as to the character, quality, quantity, or cost of the material used or to be used, or the quantity or quality of the work performed or to be performed, or the cost thereof in connection with the submission of plans, maps, specifications, contracts, or costs of construction on any highway or related project submitted for approval to the Secretary of Transportation; or

Whoever knowingly makes any false statement, false representation, false report or false claim with respect to the character, quality, quantity, or cost of any work performed or to be performed, or materials furnished or to be furnished, in connection with the construction of any highway or related project approved by the Secretary of Transportation; or

Whoever knowingly makes any false statement or false representation as to material fact in any statement, certificate, or report submitted pursuant to provisions of the Federal-aid Roads Act approved July 1, 1916, (39 Stat. 355), as amended and supplemented;

Shall be fined not more than \$10,000 or imprisoned not more than 5 years or both."

X. IMPLEMENTATION OF CLEAN AIR ACT AND FEDERAL WATER POLLUTION CONTROL ACT

(Applicable to all Federal-aid construction contracts and to all related subcontracts of \$100,000 or more.)

By submission of this bid or the execution of this contract, or subcontract, as appropriate, the bidder, Federal-aid construction contractor, or subcontractor, as appropriate, will be deemed to have stipulated as follows:

1. That any facility that is or will be utilized in the performance of this contract, unless such contract is exempt under the Clean Air Act, as amended (42 U.S.C. 1857 et seq., as amended by Pub. L. 91-604), and under the Federal Water Pollution Control Act, as amended (33 U.S.C. 1251 et seq., as amended by Pub. L. 92-500), Executive Order 11738, and regulations in implementation thereof (40 CFR 15) is not listed, on the date of contract award, on the U.S. Environmental Protection Agency (EPA) List of Violating Facilities pursuant to 40 CFR 15.20.

2. That the firm agrees to comply and remain in compliance with all the requirements of Section 114 of the Clean Air Act and Section 308 of the Federal Water Pollution Control Act and all regulations and guidelines listed thereunder.

3. That the firm shall promptly notify the SHA of the receipt of any communication from the Director, Office of Federal Activities, EPA, indicating that a facility that is or will be utilized

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for the contract is under consideration to be listed on the EPA List of Violating Facilities.

4. That the firm agrees to include or cause to be included the requirements of paragraph 1 through 4 of this Section X in every nonexempt subcontract, and further agrees to take such action as the government may direct as a means of enforcing such requirements.

XI. CERTIFICATION REGARDING DEBARMENT, SUSPENSION, INELIGIBILITY AND VOLUNTARY EXCLUSION

1. Instructions for Certification - Primary Covered Transactions:

(Applicable to all Federal-aid contracts - 49 CFR 29)

a. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.

b. The inability of a person to provide the certification set out below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such a person from participation in this transaction.

c. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause of default.

d. The prospective primary participant shall provide immediate written notice to the department or agency to whom this proposal is submitted if any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.

e. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations.

f. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.

g. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

h. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the eligibility of its principals. Each participant may, but is not required to, check the nonprocurement portion of the "Lists of Parties Excluded From Federal Procurement or Nonprocurement Programs" (Nonprocurement List) which is compiled by the General Services Administration.

i. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

j. Except for transactions authorized under paragraph f of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion—Primary Covered Transactions

1. The prospective primary participant certifies to the best of its knowledge and belief, that it and its principals:

a. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;

b. Have not within a 3-year period preceding this proposal been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;

c. Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State or local) with commission of any of the offenses enumerated in paragraph 1b of this certification; and

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d. Have not within a 3-year period preceding this application/proposal had one or more public transactions (Federal, State or local) terminated for cause or default.

2. Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

2. Instructions for Certification - Lower Tier Covered Transactions:

(Applicable to all subcontracts, purchase orders and other lower tier transactions of \$25,000 or more - 49 CFR 29)

a. By signing and submitting this proposal, the prospective lower tier is providing the certification set out below.

b. The certification in this clause is a material representation of fact upon which reliance was placed when this transaction was entered into. If it is later determined that the prospective lower tier participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

c. The prospective lower tier participant shall provide immediate written notice to the person to which this proposal is submitted if at any time the prospective lower tier participant learns that its certification was erroneous by reason of changed circumstances.

d. The terms "covered transaction," "debarred," "suspended," "ineligible," "primary covered transaction," "participant," "person," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of rules implementing Executive Order 12549. You may contact the person to which this proposal is submitted for assistance in obtaining a copy of those regulations.

e. The prospective lower tier participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency with which this transaction originated.

f. The prospective lower tier participant further agrees by submitting this proposal that it will include this clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion-Lower Tier Covered Transaction," without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.

g. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the el-

igibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.

h. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.

i. Except for transactions authorized under paragraph e of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency with which this transaction originated may pursue available remedies, including suspension and/or debarment.

**Certification Regarding Debarment,
Suspension, Ineligibility and Voluntary
Exclusion-Lower Tier Covered Transactions**

1. The prospective lower tier participant certifies, by submission of this proposal, that neither it nor its principals is presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from participation in this transaction by any Federal department or agency.

2. Where the prospective lower tier participant is unable to certify to any of the statements in this certification, such prospective participant shall attach an explanation to this proposal.

**XII. CERTIFICATION REGARDING USE OF
CONTRACT FUNDS FOR LOBBYING**

(Applicable to all Federal-aid construction contracts and to all related subcontracts which exceed \$100,000 - 49 CFR 20)

1. The prospective participant certifies, by signing and submitting this bid or proposal, to the best of his or her knowledge and belief, that:

a. No Federal appropriated funds have been paid or will be paid, by or on behalf of the undersigned, to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with the awarding of any Federal contract, the making of any Federal grant, the making of any Federal loan, the entering into of any cooperative agreement, and the extension, continuation, renewal, amendment, or modification of any Federal contract, grant, loan, or cooperative agreement.

b. If any funds other than Federal appropriated funds have been paid or will be paid to any person for influencing or attempting to influence an officer or employee of any Federal agency, a Member of Congress, an officer or employee of Congress, or an employee of a Member of Congress in connection with this Federal contract,

grant, loan, or cooperative agreement, the undersigned shall complete and submit Standard Form-LLL, "Disclosure Form to Report Lobbying," in accordance with its instructions.

2. This certification is a material representation of fact upon which reliance was placed when this transaction was made or entered into. Submission of this certification is a prerequisite for making or entering into this transaction imposed by 31 U.S.C. 1352. Any person who fails to file the required certification shall

be subject to a civil penalty of not less than \$10,000 and not more than \$100,000 for each such failure.

3. The prospective participant also agrees by submitting his or her bid or proposal that he or she shall require that the language of this certification be included in all lower tier subcontracts, which exceed \$100,000 and that all such recipients shall certify and disclose accordingly.

FEDERAL-AID FEMALE AND MINORITY GOALS

In accordance with Section II, "Nondiscrimination," of "Required Contract Provisions Federal-aid Construction Contracts" the following are the goals for female utilization:

Goal for Women
 (applies nationwide).....(percent) 6.9

The following are goals for minority utilization:

CALIFORNIA ECONOMIC AREA

	Goal (Percent)
174 Redding, CA:	
Non-SMSA Counties	6.8
CA Lassen; CA Modoc;	
CA Plumas; CA Shasta;	
CA Siskiyou; CA Tehama.	
175 Eureka, CA:	
Non-SMSA Counties	6.6
CA Del Norte; CA Humboldt;	
CA Trinity.	
176 San Francisco-Oakland-San Jose, CA:	
SMSA Counties:	
7120 Salinas-Seaside-	
Monterey, CA.....	28.9
CA Monterey.	
7360 San Francisco-Oakland, CA.....	25.6
CA Alameda; CA Contra Costa;	
CA Marin; CA San Francisco;	
CA San Mateo.	
7400 San Jose, CA.....	19.6
CA Santa Clara.	
7485 Santa Cruz, CA.....	14.9
CA Santa Cruz.	
7500 Santa Rosa, CA.....	9.1
CA Sonoma.	
8720 Vallejo-Fairfield- Napa, CA	17.1
CA Napa; CA Solano	
Non-SMSA Counties	23.2
CA Lake; CA Mendocino;	
CA San Benito.	

177 Sacramento, CA:	
SMSA Counties:	
6920 Sacramento, CA.....	16.1
CA Placer; CA Sacramento;	
CA Yolo.	
Non-SMSA Counties.....	14.3
CA Butte; CA Colusa;	
CA El Dorado; CA Glenn;	
CA Nevada; CA Sierra;	
CA Sutter; CA Yuba.	
178 Stockton-Modesto, CA:	
SMSA Counties:	
5170 Modesto, CA	12.3
CA Stanislaus.	
8120 Stockton, CA	24.3
CA San Joaquin.	
Non-SMSA Counties.....	19.8
CA Alpine; CA Amador;	
CA Calaveras; CA Mariposa;	
CA Merced; CA Tuolumne.	
179 Fresno-Bakersfield, CA:	
SMSA Counties:	
0680 Bakersfield, CA	19.1
CA Kern.	
2840 Fresno, CA.....	26.1
CA Fresno.	
Non-SMSA Counties.....	23.6
CA Kings; CA Madera;	
CA Tulare.	
180 Los Angeles, CA:	
SMSA Counties:	
0360 Anaheim-Santa Ana-Garden	
Grove, CA.	11.9
CA Orange.	
4480 Los Angeles-Long	
Beach, CA	28.3
CA Los Angeles.	
6000 Oxnard-Simi Valley-	
Ventura, CA	21.5
CA Ventura.	

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6780 Riverside-San Bernardino- Ontario, CA	19.0
CA Riverside; CA San Bernardino.	
7480 Santa Barbara-Santa Maria- Lompoc, CA	19.7
CA Santa Barbara.	
Non-SMSA Counties	24.6
CA Inyo; CA Mono; CA San Luis Obispo.	
181 San Diego, CA:	
SMSA Counties	
7320 San Diego, CA	16.9
CA San Diego.	
Non-SMSA Counties	18.2
CA Imperial.	

In addition to the reporting requirements set forth elsewhere in this contract the Contractor and subcontractors holding subcontracts, not including material suppliers, of \$10,000 or more, shall submit for every month of July during which work is performed, employment data as contained under Form FHWA PR-1391 (Appendix C to 23 CFR, Part 230), and in accordance with the instructions included thereon.

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(To be used, when applicable, in Federal-aid projects)
*Insert number of trainees.

FEDERAL REQUIREMENT TRAINING SPECIAL PROVISIONS

FEDERAL REQUIREMENT TRAINING

SPECIAL PROVISION. -- As part of the Contractor's equal employment opportunity affirmative action program, training shall be provided as follows:

The Contractor shall provide on-the-job training to develop full journeymen in the types of trades or job classification involved.

The goal for the number of trainees or apprentices to be trained under the requirements of this special provision will be _____.

In the event the Contractor subcontracts a portion of the contract work, he shall determine how many, if any, of the trainees or apprentices are to be trained by the subcontractor, provided however, that the Contractor shall retain the primary responsibility for meeting the training requirements imposed by this special provision. The Contractor shall also ensure that this Training Special Provision is made applicable to such subcontract. Where feasible, 25 percent of trainees or apprentices in each occupation shall be in their first year of apprenticeship or training.

The number of trainees or apprentices shall be distributed among the work classifications on the basis of the Contractor's needs and the availability of journeymen in the various classifications within a reasonable area of recruitment. Prior to commencing work, the Contractor shall submit to the Department for approval the number of trainees or apprentices to be trained in each selected classification and training program to be used. Furthermore, the Contractor shall specify the starting time for training in each of the classifications. The Contractor will be credited for each trainee or apprentice employed by him on the contract work who is currently enrolled or becomes enrolled in an approved program and will be reimbursed for such trainees or apprentices as provided hereinafter.

Training and upgrading of minorities and women toward journeymen status is a primary objective of this Training Special Provision. Accordingly, the Contractor shall make every effort to enroll minority and women trainees or apprentices (e.g., by conducting systematic and direct recruitment through public and private sources likely to yield minority and women trainees or apprentices) to the extent such persons are available within a reasonable area of recruitment. The Contractor will be responsible for demonstrating the steps that he has taken in pursuance thereof, prior to a determination as to whether the Contractor is in compliance with this Training Special Provision. This training commitment is not intended, and shall not be used, to discriminate against any applicant for training, whether a member of a minority group or not.

No employee shall be employed as a trainee or apprentice in any classification in which he has successfully completed a training course leading to journeyman status or in which he has been employed as a journeyman. The Contractor should satisfy this requirement by including appropriate questions in the employee application or by other suitable means. Regardless of the method used the Contractor's records should document the findings in each case.

The minimum length and type of training for each classification will be as established in the training program selected by the Contractor and approved by both the Department and the Federal Highway Administration. The Department and the Federal Highway Administration will approve a program if it is reasonably calculated to meet the equal employment opportunity obligations of the Contractor and to qualify the average trainee or apprentice for journeyman status in the classification concerned by the end of the training period. Furthermore, apprenticeship programs registered with the U.S. Department of Labor, Bureau of Apprenticeship and Training, or with the State of California, Department of Industrial Relations, Division of Apprenticeship Standards recognized by the Bureau and training programs approved but not necessarily sponsored by the U.S. Department of Labor, Manpower Administration, Bureau of Apprenticeship and Training shall also be considered acceptable provided it is being administered in a manner consistent with the equal employment obligations of Federal-aid highway construction contracts. Approval or acceptance of a training program shall be obtained from the State prior to commencing work on the classification covered by the program. It is the intention of these provisions that training is to be provided in the construction crafts rather than clerk-typists or secretarial-type positions. Training is permissible in lower level management positions such as office engineers, estimators, timekeepers, etc., where the training is oriented toward construction applications. Training in the laborer classification may be permitted provided that significant and meaningful training is provided and approved by the division office.

Some offsite training is permissible as long as the training is an integral part of an approved training program and does not comprise a significant part of the overall training. Except as otherwise noted below, the Contractor will be reimbursed 80 cents per hour of training given an employee on this contract in accordance with an approved training program. As approved by the Engineer, reimbursement will be made for training of persons in excess of the number specified herein.

This reimbursement will be made even though the Contractor receives additional training program funds from other sources, provided such other source does not specifically prohibit the Contractor from receiving other reimbursement. Reimbursement for offsite training indicated above may only be made to the Contractor where he does one or more of the following and the trainees or apprentices are concurrently employed on a Federal-aid project; contributes to the cost of the training, provides the instruction to the trainee or apprentice or pays the trainee's or apprentice's wages during the offsite training period.

No payment shall be made to the Contractor if either the failure to provide the required training, or the failure to hire the trainee or apprentice as a journeyman, is caused by the

Contractor and evidences a lack of good faith on the part of the Contractor in meeting the requirements of this Training Special Provision. It is normally expected that a trainee or apprentice will begin his training on the project as soon as feasible after start of work utilizing the skill involved and remain on the project as long as training opportunities exist in his work classification or until he

has completed his training program. It is not required that all trainees or apprentices be on board for the entire length of the contract. A Contractor will have fulfilled his responsibilities under this Training Special Provision if he has provided acceptable training to the number of trainees or apprentices specified. The number trained shall be determined on the basis of the total number enrolled on the contract for a significant period.

Only trainees or apprentices registered in a program approved by the State of California's State Administrator of Apprenticeship may be employed on the project and said trainees or apprentices shall be paid the standard wage specified under the regulations of the craft or trade at which they are employed.

The Contractor shall furnish the trainee or apprentice a copy of the program he will follow in providing the training. The Contractor shall provide each trainee or apprentice with a certification showing the type and length of training satisfactorily completed.

The Contractor will provide for the maintenance of records and furnish periodic reports documenting his performance under this Training Special Provision

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Standard Plans List

The Standard Plan sheets applicable to this contract include, but are not limited to those indicated below. Applicable Revised Standard Plans (RSP) and New Standard Plans (NSP) indicated below are included in the project plans as individual Standard Plan sheets.

GENERAL ROAD WORK (Miscellaneous)

A10A	Acronyms and Abbreviations (A-L)
A10B	Acronyms and Abbreviations (M-Z)
A10C	Symbols (Sheet 1 of 2)
A10D	Symbols (Sheet 2 of 2)
A20A	Pavement Markers and Traffic Lines, Typical Details
A20B	Pavement Markers and Traffic Lines, Typical Details
A20C	Pavement Markers and Traffic Lines, Typical Details
A20D	Pavement Markers and Traffic Lines, Typical Details
A24A	Pavement Markings - Arrows
A24B	Pavement Markings - Arrows
RSP A24C	Pavement Markings – Symbols and Numerals
A24D	Pavement Markings – Words
A24E	Pavement Markings – Words and Crosswalks
A62A	Excavation and Backfill – Miscellaneous Details
A62B	Limits of Payment for Excavation and Backfill – Bridge Surcharge and Wall
A62C	Limits of Payment for Excavation and Backfill - Bridge
A62D	Excavation and Backfill – Concrete Pipe Culverts
A62DA	Excavation and Backfill – Concrete Pipe Culverts
A62E	Excavation and Backfill – Cast-In-Place Reinforced Concrete Box and Arch Culverts
A62F	Excavation and Backfill – Metal and Plastic Culverts
A73A	Object Markers
A73B	Markers
A73C	Delineators, Channelizers and Barricades
RSP A76A	Concrete Barrier Type 60
A76B	Concrete Barrier Type 60
A76C	Concrete Barrier Type 60E

A77A2	Metal Beam Guard Railing – Standard Railing Section (Steel Post with Notched Wood or Notched Plastic Block)
A77B1	Metal Beam Guard Railing – Standard Hardware
A77C1	Metal Beam Guard Railing – Wood Post and Wood Block Details
A77C2	Metal Beam Guard Railing Steel Post, Notched Wood Block and Notched Plastic Block Details
A77C3	Metal Beam Guard Railing – Typical Line Post Embedment and Hinge Point Offset Details
A77C4	Metal Beam Guard Railing – Typical Railing Delineation and Dike Positioning Details

A77H1 Metal Railing End Anchor Assembly (Type SFT)

A77J3 Metal Beam Guard Railing Connections to Abutments and Walls
A77J4 Metal Beam Guard Railing Transition Railing (Type WB)

A77L1 Metal Beam Railing Terminal System (Type SRT)

A77L3 Metal Beam Railing Terminal System (Type ET)

RSP A81A	Crash Cushion, Sand Filled (Unidirectional)
RSP A81B	Crash Cushion, Sand Filled (Unidirectional)
RSP A81C	Crash Cushion, Sand Filled (Bidirectional)
A82A1	Crash Cushion (Type CAT)
RSP A82C1	Crash Cushion (Type React 9CBB)
A82C2	Crash Cushion (Type React 9CBB) – Backup Block Details
A82C3	Crash Cushion (Type React 9CBB) – Concrete Barrier Transition Details
A82D1	Crash Cushion (Type React 9SCBS)

A85 **Chain Link Fence**

RSP A87A	Curbs and Driveways
A87B	Asphalt Concrete Dikes
RSP A88A	Curb Ramp Details
RSP A88B	Curb Ramp and Island Passageway Details

GENERAL ROAD WORK (Pavements)

RSP P1	Jointed Plain Concrete Pavement
RSP P2	Jointed Plain Concrete Pavement – Widen Slab Details
NSP P3	Jointed Plain Concrete Pavement – Nondoweled Shoulder Addition/Reconstruction
P5 (Canceled)	CANCELED ON NOVEMBER 17, 2006
RSP P7	Dowel Bar Retrofit (Existing Jointed Plain Concrete Pavement)
NSP P8	Jointed Plain Concrete Pavement – Individual Slab Replacement
RSP P10	Concrete Pavement – Dowel Bar Details
RSP P12	Concrete Pavement – Dowel Bar Basket Details
RSP P17	Concrete Pavement – Tie Bar Basket Details
RSP P18	Concrete Pavement – Lane Schematics and Isolation Joint Detail
RSP P20	Concrete Pavement – Joint Details
P30	Concrete Pavement – End Panel Pavement Transitions
NSP P33	Concrete Pavement – Lane Drop Paving Details
P35	Concrete Pavement – Ramp Gore Area Paving Details
P45	Concrete Pavement – Drainage Inlet Details No. 1
P46	Concrete Pavement – Drainage Inlet Details No. 2
P70	Asphalt Concrete Paving (Longitudinal Tapered Notched Wedge Joint)

GENERAL ROAD WORK (Drainage)

D72	Drainage Inlets
D73	Drainage Inlets
D74A	Drainage Inlets
D74B	Drainage Inlets
D74C	Drainage Inlets Details
D75A	Pipe Inlets
RSP D75B	Pipe Inlets
D75C	Pipe Inlets
RSP D77A	Grate Details
D78A	Gutter Depressions
D78B	Inlet Depressions – Portland Cement Concrete Shoulders
RSP D78C	Inlet Depressions – Asphalt Concrete Shoulders

	GENERAL ROAD WORK (Planting and Irrigation)
H1	Planting and Irrigation – Abbreviations
RSP H2	Planting and Irrigation – Symbols

H8 **Planting and Irrigation Details**
H9 **Planting and Irrigation Details**

GENERAL ROAD WORK (Temporary Facilities)

RSP T1A **Temporary Crash Cushion, Sand Filled (Unidirectional)**
RSP T1B **Temporary Crash Cushion, Sand Filled (Bidirectional)**
RSP T2 **Temporary Crash Cushion, Sand Filled (Shoulder Installations)**
T3 **Temporary Railing (Type K)**
T4 **Temporary Traffic Screen**
T5 **Temporary Terminal Section (Type K)**
RSP T7 **Construction Project Funding Identification Signs**

RSP T10A **Traffic Control System for Lane and Complete Closures on Freeways and Expressways**

RSP T14 **Traffic Control System for Ramp Closure**

T51 **Temporary Water Pollution Control Details (Temporary Silt Fence)**

T53 **Temporary Water Pollution Control Details (Temporary Cover)**

T56 **Temporary Water Pollution Control Details (Temporary Fiber Roll)**

T58 **Temporary Water Pollution Control Details (Temporary Construction Entrance)**
T59 **Temporary Water Pollution Control Details (Temporary Concrete Washout Facility)**

BRIDGE

B15-1	Soundwall Masonry Block on Footing Detail (1)
B15-2	Soundwall Masonry Block on Footing Detail (2)
B15-3	Soundwall Masonry Block on Pile Cap Detail (1)
B15-4	Soundwall Masonry Block on Pile Cap Detail (2)
B15-5	Soundwall Masonry Block on Pile Cap Detail (3)
RSP B15-6	Soundwall Masonry Block on Type 736S/SV Barrier Details (1)
RSP B15-7	Soundwall Masonry Block on Type 736S/SV Barrier Details (2)
B15-8	Soundwall Masonry Block on Type 736S/SV Barrier Details (3)

B15-12	Soundwall Masonry Block on Barrier 1.524 m Access Gate Details (1)
B15-13	Soundwall Masonry Block on Barrier 1.524 m Access Gate Details (2)
B15-14	Soundwall Masonry Block Access Gate Locking Details

ROADSIDE SIGNS

RS1	Roadside Signs, Typical Installation Details No. 1
RS2	Roadside Signs - Wood Post, Typical Installation Details No. 2
RS3	Roadside Signs - Laminated Wood Box Post Typical Installation Details No. 3
RS4	Roadside Signs, Typical Installation Details No. 4

OVERHEAD SIGNS

RSP S1	Overhead Signs – Truss, Instructions and Examples
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- S93 Framing Details for Framed Single Sheet Aluminum Signs, Rectangular Shape**
- S94 Roadside Single Sheet Aluminum Signs, Rectangular Shape**
- S95 Roadside Single Sheet Aluminum Signs, Diamond Shape**

SIGNALS, LIGHTING AND ELECTRICAL SYSTEMS

RSP ES-1A	Electrical Systems (Symbols And Abbreviations)
RSP ES-1B	Electrical Systems (Symbols And Abbreviations)
RSP ES-1C	Electrical Systems (Symbols And Abbreviations)
RSP ES-2A	Electrical Systems (Service Equipment)
RSP ES-2C	Electrical Systems (Service Equipment Notes, Type III Series)
RSP ES-2E	Electrical Systems (Service Equipment and Typical Wiring Diagram, Type III – B Series)
RSP ES-2F	Electrical Systems (Service Equipment and Typical Wiring Diagram Type III – C Series)
RSP ES-3C	Electrical Systems (Controller Cabinet Details)
ES-4A	Electrical Systems (Signal Heads and Mountings)
ES-4B	Electrical Systems (Signal Heads and Mountings)
RSP ES-4C	Electrical Systems (Signal Heads and Mountings)

RSP ES-4D	Electrical Systems (Signal Heads and Mountings)
ES-4E	Electrical Systems (Signal Faces and Mountings)
RSP ES-5A	Electrical Systems (Detectors)
ES-5B	Electrical Systems (Detectors)
ES-5C	Electrical Systems (Detectors)
RSP ES-5D	Electrical Systems (Detectors)
RSP ES-6A	Electrical Systems (Lighting Standard Types 15 and 21)
ES-6B	Electrical Systems (Lighting Standards Types 15 and 21, Barrier Rail Mounted Details)
ES-6C (Canceled)	CANCELED ON OCTOBER 5, 2007
RSP ES-6E	Electrical Systems (Lighting Standards Types 30 and 31)
ES-6F	Electrical Systems (Lighting Standards Types 30 and 31, Base Plate Details)
ES-6G	Electrical Systems (Lighting Standards Type 32)
ES-6H	Electrical Systems (Lighting Standards Types 35 and 36-20A, 10 Degree Type)
RSP ES-7A	Electrical Systems (Signal Standards Push Button Posts and Type 15TS Standard))
RSP ES-7B	Electrical Systems (Signal And Lighting Standard – Type 1 Standard and Equipment Numbering)
RSP ES-7C	Electrical Systems (Signal and Lighting Standard – Case 1 Arm Loading, Wind Velocity = 161 km/h, Arm Lengths 4.6 m To 9.1 m)
RSP ES-7D	Electrical Systems (Signal and Lighting Standard – Case 2 Arm Loading, Wind Velocity = 161 km/h, Arm Lengths 4.6 m to 9.1 m)
RSP ES-7E	Electrical Systems (Signal and Lighting Standard – Case 3 Arm Loading, Wind Velocity = 161 km/h, Arm Lengths 4.6 m to 13.7 m)
RSP ES-7F	Electrical Systems (Signal and Lighting Standard – Case 4 Arm Loading, Wind Velocity = 161 km/h, Arm Lengths 7.6 m to 13.7 m)
RSP ES-7G	Electrical Systems (Signal and Lighting Standard – Case 5 Arm Loading, Wind Velocity = 161 km/h, Arm Lengths 15.2 m to 16.8 m)
RSP ES-7H	Electrical Systems (Signal and Lighting Standard – Case 5 Arm Loading, Wind Velocity = 161 km/h, Arm Lengths 18.2 m to 19.8 m)
RSP ES-7M	Electrical Systems (Signal and Lighting Standards – Details No. 1)

ES-7N	Electrical Systems (Signal and Lighting Standards – Details No. 2)
ES-70	Electrical Systems (Sign Illumination – Internally Illumination Street Name Sign)
RSP ES-7P	Electrical Systems (Pedestrian Barricades)
RSP ES-8	Electrical Systems (Pull Box Details)
RSP ES-9A	Electrical Systems (Electrical Details, Structure Installations)
RSP ES-9B	Electrical Systems (Electrical Details, Structure Installations)
RSP ES-9C	Electrical Systems (Electrical Details, Structure Installations)
ES-9D	Electrical Systems (Electrical Details, Structure Installations)
ES-9E	Electrical Systems (Electrical Details, Structure Installations)
RSP ES-9F	Electrical Systems (Flush Soffit Luminaire Modification Details, Structure Installations)
RSP ES-10	Electrical Systems (Isolux Diagrams)
RSP ES-11	Electrical Systems (Foundation Installations)
RSP ES-13A	Electrical Systems (Splicing Details)
RSP ES-13B	Electrical Systems (Wiring Details and Fuse Ratings)
ES-15A	Electrical Systems (Sign Illumination Equipment)
RSP ES-15C	Electrical Systems (Sign Illumination Equipment)
RSP ES-15D	Electrical Systems (Lighting and Sign Illumination Control)
RSP ES-16A	Electrical Systems (Closed Circuit Television Pole Details)

Attachment 1. City of San Bernardino Municipal Code, Chapter 8.54, Noise.

Chapter 8.54 NOISE

Sections:

- | | |
|-----------------|--|
| 8.54.010 | Noise unlawful when. |
| 8.54.020 | Acts declared loud, unnecessary and excessive noises. |
| 8.54.030 | Exceptions. |
| 8.54.040 | Violation - Penalty. |

8.54.010 Noise unlawful when.

It is unlawful for any person to make, continue, or cause to be made or continued any loud, unnecessary and excessive noise which disturbs, offends, injures or endangers the peace, quiet, comfort, repose, health, or safety of any neighborhood or persons within the limits of the City. (Ord. 1925 §1, 11-5-51.)

8.54.020 Acts declared loud, unnecessary and excessive noises.

The following acts, among others, are loud, unnecessary and excessive noises in violation of this Chapter, but said enumeration shall not be deemed to be exclusive, namely:

- A. The sounding of any horn or signal device on any motor or other vehicle for an unnecessary or unreasonable period of time;
- B. Using, operating or permitting to be played, used or operated any radio receiving set, musical instrument, phonograph or other machine or device for

producing or reproducing sound in such a manner as to disturb the peace, quiet or comfort of neighboring persons, or at any time with louder volume than is necessary for the convenient hearing of the person or persons who are in the room, vehicle or other enclosure in which such machine or device is operated, and who are voluntary listeners thereto; the operation of any such set, instrument, phonograph, machine or device between the hours of eleven p.m. and seven a.m. in such a manner as to be plainly audible at a distance of fifty feet from the building, structure or vehicle in which it is located shall be prima facie evidence of a violation of this section;

- C. Yelling, shouting, whistling or singing in a loud and boisterous manner on the public streets so as to disturb the quiet, comfort or repose of persons in any office, dwelling, hotel or other type of residence, or neighborhood;
- D. The keeping of any animal, fowl or bird which by causing frequent or long continued noise disturbs the comfort, quiet or repose of any person or neighborhood;
- E. The unnecessary or excessive blowing of whistles, sounding of horns, ringing of bells or use of signaling devices by operators of railroad locomotives, motor trucks and other transportation equipment;
- F. The creation of loud and excessive noise in connection with the loading or unloading of motor trucks and other vehicles;
- G. The shouting and crying of peddlers, hawkers and vendors which disturbs the peace and quiet of any considerable number of persons or neighborhood;
- H. The doing of automobile, automotive body or fender repair work, or other work on metal objects and metal parts, in a residential district, so as to cause loud and excessive noise which disturbs the peace, quiet and repose of any person occupying adjoining or closely situated property, or neighborhood;
- I. The operation or use between the hours of ten p.m. and seven a.m. of any pile driver, steam shovel, pneumatic hammers, derrick, steam or electric hoist, power driven saw, or any other tool or apparatus, the use of which is attended by loud and excessive noise, except with the approval of the Mayor and Common Council.

(Ord. 2102, 1956; Ord. 1925 §2, 1951.)

8.54.030 Exceptions

- A. There is excepted from this Chapter the use of horns, sirens or other signaling or warning devices by persons vested with legal authority to use the same, and in pursuit of their lawful duties, such as on ambulances, fire, police or other governmental or official equipment;
- B. Also, there is excepted in like manner such noises as are an accompaniment and effect of a lawful business, commercial or industrial enterprise carried on in an area zoned for that purpose except where there is evidence that such noise is a nuisance and that such nuisance is a result of the employment of unnecessary and injurious methods of operation.

(Ord. MC-649, 1-3-89; Ord. 1925 §3, 1951.)

8.54.040 Violation - Penalty.

Any person violating any provision of this Chapter is guilty of an infraction, which upon conviction thereof is punishable in accordance with the provisions of §1.12.010 of this Code. (Ord. MC-460, 5-13-85; Ord. 1925 §5, 1951.)

Attachment 2. City of San Bernardino Special Provisions, Section 6-1.02, Sound Control Requirements.

SECTION 6

6-1 GENERAL

6-1.02 SOUND CONTROL REQUIREMENTS -- Sound control shall comply with Chapter 8.54 of the City of San Bernardino Municipal Code and these Special Provisions.

The noise level from the Contractor's operations between the hours of 9:00 p.m. and 6:00 a.m. shall not exceed 86 dbA at the distance of 50 feet. This requirement in no way relieves the Contractor from responsibility for complying with local ordinances regulating noise levels

Said noise level requirements shall apply to all equipment on the job or related to the job, including but not limited to trucks, transit mixers or transient equipment that may or may not be owned by the Contractor. The use of loud sound signals shall be avoided in favor of light warnings except those required by safety laws for the protection of personnel.

Attachment 3. City of San Bernardino Street Closure Permit Application Form.

City of San Bernardino – Development Services Department

APPLICATION FORM FOR:

Encroachment Permit

Location

Between

and

Purpose of encroachment

Date(s) and Time(s) of encroachment

Account No. 001-000-4352 Fee \$

Insurance expiration date

Lane Closure Permit

Location

Between

and

Purpose of lane closure

Date(s) and Time(s) of lane closure

Account No. 001-000-4352 Fee \$

Insurance expiration date

24 Hour Notice

Fax number: (909) 384 – 5155

Inspection number: (909) 384 – 5111

Cancellation of Permit may occur for higher priorities due to previous approved projects, except for emergency work. Permittee shall provide warning and control devices as may be required in accordance with the latest edition of the "Work Area Traffic Control Handbook" (WATCH) as promulgated by the American Public Works Association.

Always submit a traffic control plan with Lane Closure application.

Sewer Lateral Installation Permit (Saddle Main)

Location

Dates of work

Between

and

Water Capacity Fees Receipt #

(Original to Planning Dept.)

Insurance expiration date

Residential Bedrooms Fees Receipt #

Commercial ft² Fees Receipt #

Date(s) and Time(s) of work

Account No. 245-000-4821 Fee \$

Street cut permit #

Issued

Applicant Name, Title and Signature

Company

Telephone

Address (street, city, zip code)

Application date

Attachment 4. ENVIRONMENTAL COMMITMENT RECORD.

ENVIRONMENTAL COMMITMENT RECORD

PROJECT PHASE: 95% Plan Review
REVISED DATE: February 19, 2008

CONTRACT NUMBER: 08-0071V County Sbd Route I-215
Location San Bernardino: .12 Mile South Redlands Loop Overhead to .09
Mile South of Massachusetts Ave.
CCA:

**THIS DOCUMENT CONTAINS SOME OF THE NOTABLE
ENVIRONMENTAL COMMITMENTS: HOWEVER, THE
CONTRACTOR IS STILL RESPONSIBLE FOR ALL CONDITIONS
IN THE ATTACHED PERMITS.**

PMs: Joe Meraz Caltrans (OR) Dennis Saylor SANBAG
PROJECT DESCRIPTION: I-215 Improvement Projects
SEGMENTS: Segment 1 & 2 PM 6.5-8.9
ENVIRONMENTAL GENERALIST: Kerrie Hudson

SANBAG TO AAA THESE SEGMENTS OF I-215

RESIDENT ENGINEER: CELL (951) -
ENVIRONMENTAL LIAISON: Patraic Kelly (951) 232-8511

ENVIRONMENTAL COMMITMENTS	RESPONSIBILITY	MONITORED	DONE	TIMING	COMMENTS/COVERED SSP
All public utility facilities affected by the project will be relocated and/or accommodated in accordance with state laws, and regulations and Caltrans policies concerning utility encroachments within State highway right-of-way. STORMWATER: Revising and resubmitting the "Notification of Construction" to the (Regional Water Quality Control Board) RWQCB by Resident Engineer.	SANBAG /RW/RE	SANBAG RW/RE		Const.	
	SANBAG /RE	SANBAG /RE		Pre-Const.	Required for all projects with SWDR.

AIR QUALITY/CONSTRUCTION: Appendix B & Page 21-23 Re-Evaluation November 2005.					
To reduce fugitive dust emissions, the construction contractor shall adhere to the requirements of SCAQMD Rule 403. The Best Available Control Measures (BACM) and Reasonably Available Control Measures (RACM) specified in SCAQMD's Rule 403 Implementation Handbook shall be incorporated into the project construction.	SANBAG Contractor	SANBAG RE		Const.	SSP – Dust Control SSP – Rules and Regulations
The RE must require contractor to apply for and obtain permit from AQMD prior to starting work. The construction contractor shall adhere to the requirements of SCAQMD rules and regulations on cutback and emulsified asphalt paving materials. RE to verify contractor has obtained clearance/permit from SCAQMD before starting work.	SANBAG /RE	SANBAG /RE		Pre-Const.	The RE must require contractor to apply for and obtain permit from AQMD prior to starting work. The construction contractor shall adhere to the requirements of SCAQMD rules and regulations on cutback and emulsified asphalt paving materials. RE to verify contractor has obtained clearance/permit from SCAQMD before starting work.
BUSINESS:					
Page 17 Re-Evaluation November 2005					
Mitigation measures proposed to offset any potential impacts include, but are not limited to, the following: Provide project information via mail to affected residents and businesses in project area.	SANBAG /RE/PIO	SANBAG RE/PIO		Pre-Con Const.	SSP/Plans Traffic Handling Plan/TMP
Place detour signs at various points along detour routes and major streets where they are clearly visible to motorists.	SANBAG /RE/PM	SANBAG RE/PM		Pre-Con Const.	SSP/Plans Traffic Handling Plan/TMP
Place signs along alternate routes for special community resources identified above.	SANBAG /RE/PM	SANBAG RE/PM		Pre-Con Const.	SSP/Plans Traffic Handling Plan/TMP
Ramps and/or streets that affect Inland Center Mall or Carousel Mall shall remain open during holiday shopping season (November 26 through January 2).	SANBAG Construction	SANBAG /PM		PS&E	Traffic Handling Plan/TMP Ramp Lane Requirements Chart 5-6/AIS Report.
Coordinate construction of I-215 Improvements Project with other projects in the area.	PM/City/SANBAG	SANBAG /PM		Pre-Con Const.	Meetings

Establish a toll free project information number and a project website.	PM/SANBAG	SANBAG /PM	Pre-Con Const.	Meetings/SANBAG & Caltrans Website and 1-877-215-NEWS
Distribute public information via press releases, advertisements in local newspapers, announcements on local TV and radio stations.	PIO/SANBAG	SANBAG /PM	Pre-Con Const.	Project Public Outreach Plan
Provide project information via mail to affected residents and businesses in project area.	PIO/SANBAG	SANBAG /PM	Pre-Con Const.	Project Public Outreach Plan
VISUAL/AESTHETICS:				
Page 19-20 Re-Evaluation November 2005.				
The following mitigation for adverse visual effects have been developed for Segments 1 and 2: Caltrans, in cooperation with the city of San Bernardino, has developed a Master Plan for Aesthetics and Landscaping for the 215 Corridor.	SANBAG City/Caltrans Landscape	SANBAG RE/Landscape	Pre-Con Const.	Coordinate with City
Structures, retaining walls, and bridge rails designs are enhanced with form liner-textured surfaces consistent with the corridor theme per the Master Plan.	SANBAG Caltrans Landscape	SANBAG /RE	Design PS&E	Plans
Bridge abutments will receive formed murals at the Mill St, 2nd St and 3rd St undercrossings to enhance these three City gateway locations. Mural designs are complete and incorporated into project plans.	SANBAG Caltrans Landscape	SANBAG /RE	Design PS&E	Plans
One or more City-designed and maintained murals will be installed on one or more walls facing the City. A Memorandum of Understanding between SANBAG, the City and Caltrans is pending.	SANBAG Caltrans Landscape	SANBAG /RE	Design PS&E	Plans
Existing palm trees, as feasible, will be transplanted to the Orange Show interchange. Only direct transplanting of existing palms to permanent locations will be considered; stockpiling of existing trees is not feasible. For other locations in the corridor, new palm trees at least 15 feet (4.5 meters) in height will be planted.	SANBAG Contractor/Caltrans Landscape	SANBAG /RE	PS&E Const.	Plans
Landscaping will be installed with the Segment 3 contract at the Orange Show Road interchange; other landscaping will be installed after the roadway construction contracts. Plant material and concepts will follow the Master Plan	SANBAG Caltrans Landscape/Stormwater Contractor	SANBAG /RE	Const.	Co-Op Agreement

irrigation infrastructure will be installed under the roadway contracts.							
Gore points and other unmaintainable roadside areas will be surfaced with rock blanket.	SANBAG Contractor/Caltrans Landscape	SANBAG/RE			PS&E		SSPs & Plans
Soundwalls conform to the Master Plan-specified materials and color. Vines will be planted to soften the walls and deter graffiti on the residential side of the soundwalls.	SANBAG Contractor/Caltrans Landscape	SANBAG/RE			PS&E		SSPs & Plans
It was proposed to replace mature trees that cannot be transplanted at a ratio of 5:1. Landscaped areas are restricted in size along much of the I-215 corridor. As a result, recovery zone setbacks prohibit tree planting except in larger interchanges or protected areas. Discussions between Caltrans, SANBAG, and the city of San Bernardino regarding feasible locations to plant trees, as well as appropriate replacement ratios, are ongoing.	SANBAG Contractor/Caltrans Landscape	SANBAG/RE			PS&E Const.		
In addition, it was proposed to protect in place existing planting not impacted by freeway construction. Grading requirements for the current project design will impact almost all existing planting. Replacement landscaping will be installed as described in the above mitigation measures.	SANBAG Contractor/Caltrans Landscape/RE	SANBAG/RE			PS&E Const.		Plans & Field
INVASIVE SPECIES:							
Page 25 Re-Evaluation November 2005.							
Construction equipment will be cleaned of mud or other debris that may contain invasive plants and/or seeds and inspected to reduce the potential of spreading noxious weeds before mobilizing to arrive at the site and before leaving the site.	Contractor	SANBAG/RE/ Bio			Pre-Const. Post-Const.		
Trucks with loads carrying vegetation will be covered and vegetative materials removed from the site will be disposed of in accordance with applicable laws and regulations.	Contractor	SANBAG/RE/ Bio			Const.		
Bared soil will be landscaped with Caltrans' recommended seed mix from locally adapted species to preclude the invasion of noxious weeds. The use of site specific materials, which are adapted to local conditions, increases	Contractor	SANBAG/RE/ BIO			Const.		

the likelihood that revegetation will be successful and maintains the genetic integrity of the local ecosystem. Arrangements will be made well in advance of planting (nine months, if possible) to ensure that plant materials are located and available for the scheduled planting time.						
If buried cultural resources are encountered during construction, it is Caltrans policy that work stop in that area until a qualified archaeologist can evaluate the nature and significance of the find. In the event that human remains, including isolated, is articulated bones or fragments, are discovered during any construction-related activity, work will cease in the vicinity of the human remains. The District Environmental Branch Chief (DBBC), Christie Hammond (909) 383-6933 or District Native American Coordinator (DNAC), Karen K. Swope (909) 383-4042 will be contacted immediately. Additional survey will be required if the project changes to include areas not previously surveyed for cultural resources.	SANBAG/RE/Cult.	SANBAG/RE/Cult.			Const.	Caltrans Environmental Support Cultural Division required language for ECR.
MITIGATION MONITORING REPORT RECORD:						
Attachment F Re-Evaluation November 2005:						
Relocations/Property Acquisitions:						
Page 4-7 EIR/EIS 1999.						
Standard relocation assistance to be provided to property owners and tenants.	SANBAG Caltrans Right-of-Way (R/W)	SANBAG Caltrans R/W Property owners and tenants			PA&ED PS&E	
Standard relocation assistance to be provided to business owners and operators. (Construction)	SANBAG Caltrans R/W	SANBAG Caltrans R/W Property owners and tenants			PA&ED PS&E	
Reconfigure remaining parking spaces in existing lots to maximize number of available spaces. Consider shared spaces between adjacent properties where practical. Provide code variances where appropriate. (Design)	SANBAG Caltrans Design/R/W/ Individual Property Owners/Business	SANBAG Caltrans/City of San Bernardino			PS&E	Agreements involving property owners & businesses.

Construction replacement parking where no other options are available. (Construction)	Operators SANBAG Caltrans Design/R/W	SANBAG Caltrans/Property Owners			PS&E	Plans & Relocation documents
Geometric features, soundwalls and grade profiles to be designed to minimize visual impacts, through techniques such as district approved texture, color and rounding or contouring graded slopes. (Design)	SANBAG Caltrans Design/Landscape	SANBAG Caltrans Design/Landscape/PM			PS&E	Plans
Noise:						
Page 4-67 EIR/EIS 1999:						
Soundwall construction to provide noise abatement where reasonable and feasible not soundwall construction to reduce residual noise levels below abatement criteria (Design) under mitigation (Implementation phase).	SANBAG Caltrans Design/Environmental	SANBAG Caltrans Design			PS&E	Plans
Land Use:						
Page 15 RE-Evaluation November 2005						
Maintain integrity of land use district in placing Cul-de-sac streets and connecting roads. (Design)	SANBAG Caltrans Design	SANBAG Caltrans Design/PM			PS&E	Plans and Reports to the City of San Bernardino.
Utilize buildable remnant parcels for relocation of Displaced businesses or residences within each Respective land use district, if possible. (Design)	SANBAG Caltrans Design	SANBAG Caltrans Design/City of San Bernardino			PS&E	Plans and Reports to the City of San Bernardino.
Geotechnical Considerations:						
Standard seismic design provisions and special design features, including: 1) use of hinge restraints to hold together superstructure elements, 2) use of heavy keys to limit movement between superstructures and abutments & 3) use of reinforced column sections. (Design)	SANBAG Caltrans Design	SANBAG Caltrans Design			PS&E	Plans
Use of engineering measures such as: 1) densification of loose soil by excavations & recompressions, 2) use of piles beneath structures & 3) use of tensile reinforcement in embankments. (Design/Construction)	SANBAG Caltrans Design/REs	SANBAG Caltrans Design/REs			PS&E	Plans and field inspections
Limit cut slopes to less than 9 meters (30 feet). Maximum slopes to be 2:1. Use stabilizing ground cover, geogrids, concrete surfacing or other surfacing methods, as	SANBAG Caltrans Design/RE	SANBAG Caltrans Design/RE			PS&E	Plans and field inspections

appropriate. (Construction)									
Subsurface drainage facilities where necessary; design considerations as needed for pavement drainage, utility installation, retaining walls & other structures; standard drainage design features. (Design)	SANBAG Caltrans Design	SANBAG Caltrans Design						PS&E	Plans
Water Quality:									
Appendix E EIR/EIS 1999:									
Compliance with applicable laws and regulations regarding drawings and erosion control; possible need to obtain RWQCB permits. (Construction)	SANBAG RE	SANBAG RE						PS&E	
Wetlands and Floodplains:									
Page 4-75 EIR/EIS 1999:									
Standard design considerations to minimize runoff. (Design)	SANBAG Caltrans Design/Hydrology	SANBAG Caltrans Design						PS&E	Plans
Hazardous Waste:									
Page 4-85 EIR/EIS 1999:									
Coordinate with Santa Ana Regional Water Quality Control Board (RWQB) and San Bernardino (SBd) Department of Environmental Health Services (SBEHS) regarding ongoing investigation of the Santa Fe plume. U.S. Environmental Protection Agency (EPA), City of SBd Municipal Water Department (SBWMD), CalEPA CA Department of Health Services (DoHS), and possibly RWQB and SBEHS must be contacted regarding the Muscoy plume of the Newmark Superfund Site. Air Quality Management District (AQMD), CA Dept. of Toxic Substances Control (DTCS) and possibly SBEHS must be contacted regarding buried ACMs. (Construction)	SANBAG Caltrans Design/RE	Identified Agencies under commitments						PS&E Const.	Correspondence with identified agencies.
Caltrans policy on asbestos removal to be followed.	SANBAG Caltrans Design/RE/Haz Waste	SANBAG RE						PS&E	
Historic and Archaeological Resources:									
Page 4-90 EIR/EIS 1999:									
R/W acquisition must not include the Tropicana Apartments property. If necessary, retaining walls or other	SANBAG Caltrans Design	SANBAG Caltrans						PS&E	Plans

such structures may be used at the R/W line to avoid a need for encroachment.									
Construction:									
Page 4-96-4-97 EIR/EIS 1999:									
Standard construction safeguards and engineering practices.	SANBAG Caltrans RE	SANBAG Caltrans RE							Plans & field inspections
Use of artificial barriers. Scheduling of multiple noisy operations concurrently. Where practical, constructing soundwalls during initial project phases. Use of alternative construction methods. Control of noise levels at the source. Use of noisier equipment during daytime hours.	SANBAG Caltrans RE	SANBAG Caltrans RE							Plans & field inspections
Selection of appropriate haul routes and handling measures.	SANBAG Caltrans RE	SANBAG Caltrans RE							Plans & field inspections
Coordination with appropriate utility companies.	SANBAG Caltrans Design	SANBAG Caltrans Design/RE/Utility Companies							Plans & field inspections
Screen construction sites from view where possible. Constrain movements of construction equipment and vehicles to reduce intrusion into residential areas. Provide signage and warnings. Locate staging areas away from sensitive areas and fence.	SANBAG Caltrans Design	SANBAG Caltrans RE/Design/Utility Companies						PS&E	Plans & field inspections
Follow procedures as outlined in the Manual of Traffic Control for Construction and Maintenance Work Zone. Develop and implement a traffic control plan. Provide signage and lighting to warn of construction activities during periods of low traffic volumes. Maintain coordination with local agencies and provide media announcements of construction activities.	SANBAG Caltrans RE	SANBAG Caltrans RE/City of San Bernardino						Const.	Plans & field inspections
Traffic management techniques discussed above. Continued coordination with the business community. Appropriate use of detours and signage noting alternative routes.	SANBAG Caltrans RE	SANBAG Caltrans RE/Businesses							Plans & field inspections

Attachment 5. UNDERGROUND TUNNEL CLASSIFICATION

DEPARTMENT OF INDUSTRIAL RELATIONS
DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

464 West Fourth Street, Suite 354
San Bernardino, CA, 92401



Telephone (909) 383-6782
FAX (909) 388-7132

September 8, 2008

Mr. Ben Kho, P.E.
DMJM Harris
800 N. Haven, Suite 410
Ontario, CA 91764

Subject: Underground Classification Numbers — C008-071-09T thru C011-071-09T
Drainage System No. 100 - I-215 Freeway Segments 1 and 2 Widening and Drainage

Dear Mr. Kho:

The information provided to this office relative to the above project has been reviewed. On the basis of this analysis, Underground Classifications of "Potentially-Gassy" have been assigned to the tunnel bores identified on your submittal. Please retain copies for your records and deliver true and correct copies of the Classification to the contractor(s) engaged in the work (for posting at the jobsite). In the future, any classification request will require a full size set of drawings.

A Pre-job Conference with the Division is required prior to commencing any activity associated with construction of tunnels. Also, be advised that, whenever an employee enters any bore or shaft being constructed under 30-inches in diameter, the Mining and Tunneling Unit then has immediate jurisdiction over that job. Please contact us prior to entering such spaces.

If you have any questions, please contact this office.

Sincerely,


Jim Henze
Senior Engineer

cc: Mr. Joseph Meraz, P.E.
Cal Trans District 8
464 West 4th Street 11th Floor
San Bernardino, CA 92401



State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

San Bernardino Office R5D3

Underground Classification

C009-071-09T

Cal-Trans District 8

(NAME OF TUNNEL OR MINE AND COMPANY NAME)

464 West 4th Street 10th Floor San Bernardino, CA 92401

of

(MAILING ADDRESS)

Drainage System No. 100 - I-215 Freeway Segments 1 and 2 Widening

at

(LOCATION)

POTENTIALLY-GASSY

has been classified as

(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

A 96-inch diameter estimated 308-feet long bore underneath Rialto Avenue along the west side of I-215 located between metric construction stations 5+26.17 and 6+20.00, San Bernardino, San Bernardino County.

This classification shall be conspicuously posted at the place of employment.

Date September 8, 2008



Jim Henze, Senior Engineer

cc: File





State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

San Bernardino Office R5D3

Underground Classification

C010-071-09T

Cal-Trans District 8

(NAME OF TUNNEL OR MINE AND COMPANY NAME)

464 West 4th Street 10th Floor San Bernardino, CA 92401

of

(MAILING ADDRESS)

Drainage System No. 100 - I-215 Freeway Segments 1 and 2 Widening

at

(LOCATION)

POTENTIALLY-GASSY

has been classified as

(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

SPECIAL CONDITIONS

1. The exact locations of existing hazardous utilities such as the 4-inch gas line in vicinity of the bore are to be field verified.

A 96-inch diameter estimated 131-feet long bore underneath 2nd Street along the west side of I-215 located between metric construction stations 7+30.00 and 7+70.00, San Bernardino, San Bernardino County.

This classification shall be conspicuously posted at the place of employment.

Date September 8, 2008


Jim Henze, Senior Engineer

cc: File



81 0204



State of California

Department of Industrial Relations

DIVISION OF OCCUPATIONAL SAFETY AND HEALTH
MINING AND TUNNELING UNIT

San Bernardino Office R5D3

Underground Classification

C011-071-09T

Cal-Trans District 8

(NAME OF TUNNEL OR MINE AND COMPANY NAME)

464 West 4th Street 10th Floor San Bernardino, CA 92401

of

(MAILING ADDRESS)

Drainage System No. 100 - I-215 Freeway Segments 1 and 2 Widening

of

(LOCATION)

POTENTIALLY-GASSY

has been classified as

(CLASSIFICATION)

as required by the California Labor Code Section 7955.

The Division shall be notified if sufficient quantities of flammable gas or vapors have been encountered underground. Classifications are based on the California Labor Code Part 9, Tunnel Safety Orders and Mine Safety Orders.

A 96-inch diameter estimated 112-foot long bore underneath the south bound I-215 3rd Street off-ramp along the west side of I-215 located between metric construction stations 11+20.00 and 11+54.14, San Bernardino, San Bernardino County.

This classification shall be conspicuously posted at the place of employment.

Date September 8, 2008


Jim Henze, Senior Engineer

cc: File



01-0200

Attachment 6. FEDERAL PREVAILING WAGE

GENERAL DECISION: CA20080037 05/01/2009 CA37

Date: May 1, 2009

General Decision Number: CA20080037 05/01/2009

Superseded General Decision Number: CA20070037

State: California

Construction Types: Building, Heavy (Heavy and Dredging) and Highway

County: San Bernardino County in California.

BUILDING CONSTRUCTION PROJECTS; DREDGING PROJECTS (does not include hopper dredge work); HEAVY CONSTRUCTION PROJECTS (does not include water well drilling); HIGHWAY CONSTRUCTION PROJECTS

Modification Number	Publication Date
0	02/08/2008
1	02/15/2008
2	02/22/2008
3	02/29/2008
4	03/07/2008
5	03/28/2008
6	04/04/2008
7	04/11/2008
8	05/09/2008
9	06/20/2008
10	07/04/2008
11	07/11/2008
12	08/01/2008
13	08/15/2008
14	08/29/2008
15	09/12/2008
16	10/03/2008
17	01/02/2009
18	02/06/2009
19	02/27/2009
20	03/06/2009
21	04/03/2009
22	04/17/2009
23	05/01/2009

ASBE0005-002 08/07/2007

	Rates	Fringes
Asbestos Workers/Insulator (Includes the application of all insulating materials, protective coverings, coatings, and finishes to all types of mechanical systems).....	\$ 37.01	10.84
Fire Stop Technician (Application of Firestopping Materials for wall openings and penetrations in walls, floors, ceilings and curtain walls).....	\$ 20.76	10.23

ASBE0005-004 08/07/2006

Rates

Fringes

Asbestos Removal worker/hazardous material handler (Includes preparation, wetting, stripping, removal, scrapping, vacuuming, bagging and disposing of all insulation materials from mechanical systems, whether they contain asbestos or not)....\$ 19.55	6.38
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BOIL0092-003 10/01/2008

Rates

Fringes

BOILERMAKER.....\$ 39.24	20.26
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* BRCA0004-011 05/01/2009

Rates

Fringes

Bricklayer; Marble Setter.....\$ 35.25	10.62
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BRCA0018-004 06/01/2008

Rates

Fringes

MARBLE FINISHER.....\$ 25.52	9.08
TILE FINISHER.....\$ 21.07	7.88
TILE LAYER.....\$ 32.05	11.99

BRCA0018-010 09/01/2008

Rates

Fringes

TERRAZZO FINISHER.....\$ 26.59	9.62
TERRAZZO WORKER/SETTER.....\$ 33.63	10.46

CARP0409-001 07/01/2008

Rates

Fringes

CARPENTER

(1) Carpenter, Cabinet Installer, Insulation Installer, Hardwood Floor Worker and acoustical installer.....\$ 37.35	9.82
(2) Millwright.....\$ 37.85	9.82
(3) Piledriver/Derrick Bargeman, Bridge or Dock Carpenter, Heavy Framer, Rock Bargeman or Scowman, Rockslinger, Shingler (Commercial).....\$ 37.48	9.82
(4) Pneumatic Nailer, Power Stapler.....\$ 37.60	9.82
(5) Sawfiler.....\$ 37.44	9.82
(6) Scaffold Builder.....\$ 28.55	9.82
(7) Table Power Saw Operator.....\$ 37.45	9.82

FOOTNOTE: Work of forming in the construction of open cut sewers or storm drains, on operations in which horizontal lagging is used in conjunction with steel H-Beams driven or placed in pre- drilled holes, for that portion of a lagged trench against which concrete is poured, namely, as a substitute for back forms (which work is performed by piledrivers): \$0.13 per hour additional. Certified Welder - \$1.00 per hour premium.

CARP0409-002 07/01/2008

	Rates	Fringes
Diver		
(1) Wet.....	\$ 663.68	9.82
(2) Standby.....	\$ 331.84	9.82
(3) Tender.....	\$ 323.84	9.82
(4) Assistant Tender.....	\$ 299.84	9.82

Amounts in "Rates" column are per day

CARP0409-005 07/01/2008

	Rates	Fringes
Drywall		
DRYWALL INSTALLER/LATHER....	\$ 37.35	10.10
STOCKER/SCRAPPER.....	\$ 10.00	6.67

CARP0409-008 07/01/2008

	Rates	Fringes
Modular Furniture Installer.....	\$ 19.00	7.41

ELEC0011-002 03/01/2008

COMMUNICATIONS AND SYSTEMS WORK

	Rates	Fringes
Communications System		
Installer.....	\$ 26.43	3%+7.60
Technician.....	\$ 28.23	3%+7.60

SCOPE OF WORK:

Installation, testing, service and maintenance of systems utilizing the transmission and/or transference of voice, sound, vision and digital for commercial, educational, security and entertainment purposes for the following: TV monitoring and surveillance, background-foreground music, intercom and telephone interconnect, inventory control systems, microwave transmission, multi-media, multiplex, nurse call systems, radio page, school intercom and sound, burglar alarms, fire alarm (see last paragraph below) and low voltage master clock systems in commercial buildings. Communication Systems that transmit or receive information and/or control systems that are intrinsic to the above listed systems; inclusion or exclusion of terminations and testings of conductors determined by their function; excluding all other data systems or multiple systems which include control function or power supply; excluding installation of raceway systems, conduit systems, line voltage work, and energy management systems. Does not

cover work performed at China Lake Naval Ordnance Test Station. Fire alarm work shall be performed at the current inside wireman total cost package.

ELEC0477-002 06/01/2008

	Rates	Fringes
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Electricians:

Electrician.....	\$ 34.00	3%+14.70
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CABLE SPLICER: \$1.00 per hour above Electrician rate.

TUNNEL WORK: 10% above Electrician rate.

ZONE PAY:

Zone A - 80 road miles from Post Office, 455 Orange Show Lane, San Bernardino, will be a free zone for all contractors

Zone B - Any work performed outside Zone A's 80 road miles, shall add \$8.00 per hour to the current wage scale.

ELEC1245-001 06/01/2008

	Rates	Fringes
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LINE CONSTRUCTION

(1) Lineman; Cable splicer..	\$ 43.07	12.57
(2) Equipment specialist (operates crawler tractors, commercial motor vehicles, backhoes, trenchers, cranes (50 tons and below), overhead & underground distribution line equipment).....	\$ 34.40	11.53
(3) Groundman.....	\$ 26.31	11.29
(4) Powderman.....	\$ 38.46	11.69

HOLIDAYS: New Year's Day, M.L. King Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day and day after Thanksgiving, Christmas Day

ELEV0018-001 01/01/2009

	Rates	Fringes
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ELEVATOR MECHANIC.....	\$ 44.10	18.285
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FOOTNOTE:

PAID VACATION: Employer contributes 8% of regular hourly rate as vacation pay credit for employees with more than 5 years of service, and 6% for 6 months to 5 years of service.
PAID HOLIDAYS: New Years Day, Memorial Day, Independence Day, Labor Day, Veterans Day, Thanksgiving Day, Friday after Thanksgiving, and Christmas Day.

* ENGI0012-003 07/01/2008

	Rates	Fringes
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POWER EQUIPMENT OPERATOR (All
Other Work)

GROUP 1.....	\$ 35.28	16.47
GROUP 2.....	\$ 36.06	16.47

GROUP 3.....	\$ 36.35	16.47
GROUP 4.....	\$ 37.84	16.47
GROUP 5.....	\$ 38.94	16.47
GROUP 6.....	\$ 38.06	16.47
GROUP 7.....	\$ 39.16	16.47
GROUP 8.....	\$ 38.17	16.47
GROUP 9.....	\$ 39.27	16.47
GROUP 10.....	\$ 38.29	16.47
GROUP 11.....	\$ 39.39	16.47
GROUP 12.....	\$ 38.46	16.47
GROUP 13.....	\$ 38.56	16.47
GROUP 14.....	\$ 38.59	16.47
GROUP 15.....	\$ 38.67	16.47
GROUP 16.....	\$ 38.79	16.47
GROUP 17.....	\$ 38.96	16.47
GROUP 18.....	\$ 39.06	16.47
GROUP 19.....	\$ 39.17	16.47
GROUP 20.....	\$ 39.29	16.47
GROUP 21.....	\$ 39.46	16.47
GROUP 22.....	\$ 39.56	16.47
GROUP 23.....	\$ 39.67	16.47
GROUP 24.....	\$ 39.79	16.47
GROUP 25.....	\$ 39.96	16.47

POWER EQUIPMENT OPERATOR

(Cranes, Piledriving &
Hoisting)

GROUP 1.....	\$ 36.63	16.47
GROUP 2.....	\$ 37.41	16.47
GROUP 3.....	\$ 37.70	16.47
GROUP 4.....	\$ 37.84	16.47
GROUP 5.....	\$ 38.06	16.47
GROUP 6.....	\$ 38.17	16.47
GROUP 7.....	\$ 38.29	16.47
GROUP 8.....	\$ 38.46	16.47
GROUP 9.....	\$ 38.63	16.47
GROUP 10.....	\$ 39.63	16.47
GROUP 11.....	\$ 40.63	16.47
GROUP 12.....	\$ 41.63	16.47
GROUP 13.....	\$ 42.63	16.47

POWER EQUIPMENT OPERATOR

(Tunnel Work)

GROUP 1.....	\$ 37.13	16.47
GROUP 2.....	\$ 37.91	16.47
GROUP 3.....	\$ 38.20	16.47
GROUP 4.....	\$ 38.34	16.47
GROUP 5.....	\$ 38.56	16.47
GROUP 6.....	\$ 38.67	16.47
GROUP 7.....	\$ 38.79	16.47

PREMIUM PAY:

\$3.75 per hour shall be paid on all Power Equipment Operator work on the following Military Bases: China Lake Naval Reserve, Vandenberg AFB, Point Arguello, Seely Naval Base, Fort Irwin, Nebo Annex Marine Base, Marine Corp Logistics Base Yermo, Edwards AFB, 29 Palms Marine Base and Camp Pendleton

Workers required to suit up and work in a hazardous material environment: \$2.00 per hour additional. Combination mixer and compressor operator on gunite work shall be classified as a concrete mobile mixer operator.

POWER EQUIPMENT OPERATORS CLASSIFICATIONS

GROUP 1: Bargeman; Brakeman; Compressor operator; Ditch Witch, with seat or similar type equipment; Elevator operator-inside; Engineer Oiler; Forklift operator (includes loed, lull or similar types under 5 tons; Generator operator; Generator, pump or compressor plant operator; Pump operator; Signalman; Switchman

GROUP 2: Asphalt-rubber plant operator (nurse tank operator); Concrete mixer operator-skip type; Conveyor operator; Fireman; Forklift operator (includes loed, lull or similar types over 5 tons; Hydrostatic pump operator; oiler crusher (asphalt or concrete plant); Petromat laydown machine; PJU side dum jack; Screening and conveyor machine operator (or similar types); Skiploader (wheel type up to 3/4 yd. without attachment); Tar pot fireman; Temporary heating plant operator; Trenching machine oiler

GROUP 3: Asphalt-rubber blend operator; Bobcat or similar type (Skid steer); Equipment greaser (rack); Ford Ferguson (with dragtype attachments); Helicopter radioman (ground); Stationary pipe wrapping and cleaning machine operator

GROUP 4: Asphalt plant fireman; Backhoe operator (mini-max or similar type); Boring machine operator; Boxman or mixerman (asphalt or concrete); Chip spreading machine operator; Concrete cleaning decontamination machine operator; Concrete Pump Operator (small portable); Drilling machine operator, small auger types (Texoma super economatic or similar types - Hughes 100 or 200 or similar types - drilling depth of 30' maximum); Equipment greaser (grease truck); Guard rail post driver operator; Highline cableway signalman; Horizontal Directional Drilling Machine; Hydra-hammer-aero stomper; Micro Tunneling (above ground tunnel); Power concrete curing machine operator; Power concrete saw operator; Power-driven jumbo form setter operator; Power sweeper operator; Rock Wheel Saw/Trencher; Roller operator (compacting); Screed operator (asphalt or concrete); Trenching machine operator (up to 6 ft.); Vacuum or much truck

GROUP 5: Equipment Greaser (Grease Truck/Multi Shift).

GROUP 6: Articulating material hauler; Asphalt plant engineer; Batch plant operator; Bit sharpener; Concrete joint machine operator (canal and similar type); Concrete planer operator; Dandy digger; Deck engine operator; Derrickman (oilfield type); Drilling machine operator, bucket or auger types (Calweld 100 bucket or similar types - Watson 1000 auger or similar types - Texoma 330, 500 or 600 auger or similar types - drilling depth of 45' maximum); Drilling machine operator; Hydrographic seeder machine operator (straw, pulp or seed), Jackson track maintainer, or similar type; Kalamazoo Switch tamper, or similar type; Machine tool operator; Maginnis internal full slab vibrator, Mechanical berm, curb or gutter (concrete or asphalt); Mechanical finisher operator (concrete, Clary-Johnson-Bidwell or similar); Micro tunnel system (below ground); Pavement breaker operator (truck mounted); Road oil mixing machine operator; Roller operator (asphalt or finish), rubber-tired earth moving equipment (single engine, up to and including 25 yds. struck); Self-propelled tar pipelining machine operator; Skiploader operator (crawler and wheel type, over 3/4 yd. and up to and including 1-1/2 yds.); Slip form pump operator (power

driven hydraulic lifting device for concrete forms); Tractor operator-bulldozer, tamper-scraper (single engine, up to 100 h.p. flywheel and similar types, up to and including D-5 and similar types); Tugger hoist operator (1 drum); Ultra high pressure waterjet cutting tool system operator; Vacuum blasting machine operator

GROUP 7: Welder - General

GROUP 8: Asphalt or concrete spreading operator (tamping or finishing); Asphalt paving machine operator (Barber Greene or similar type); Asphalt-rubber distribution operator; Backhoe operator (up to and including 3/4 yd.), small ford, Case or similar; Cast-in-place pipe laying machine operator; Combination mixer and compressor operator (gunite work); Compactor operator (self-propelled); Concrete mixer operator (paving); Crushing plant operator; Drill Doctor; Drilling machine operator, Bucket or auger types (Calweld 150 bucket or similar types - Watson 1500, 2000 2500 auger or similar types - Texoma 700, 800 auger or similar types - drilling depth of 60' maximum); Elevating grader operator; Grade checker; Gradall operator; Grouting machine operator; Heavy-duty repairman; Heavy equipment robotics operator; Kalamazoo balliste regulator or similar type; Kolman belt loader and similar type; Le Tourneau blob compactor or similar type; Loader operator (Athey, Euclid, Sierra and similar types); Mobark Chipper or similar; Ozzie padder or similar types; P.C. slot saw; Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pumpcrete gun operator; Rock Drill or similar types; Rotary drill operator (excluding caisson type); Rubber-tired earth-moving equipment operator (single engine, caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator (multiple engine up to and including 25 yds. struck); Rubber-tired scraper operator (self-loading paddle wheel type-John Deere, 1040 and similar single unit); Self-propelled curb and gutter machine operator; Shuttle buggy; Skiploader operator (crawler and wheel type over 1-1/2 yds. up to and including 6-1/2 yds.); Soil remediation plant operator; Surface heaters and planer operator; Tractor compressor drill combination operator; Tractor operator (any type larger than D-5 - 100 flywheel h.p. and over, or similar-bulldozer, tamper, scraper and push tractor single engine); Tractor operator (boom attachments), Traveling pipe wrapping, cleaning and bending machine operator; Trenching machine operator (over 6 ft. depth capacity, manufacturer's rating); trenching Machine with Road Miner attachment (over 6 ft depth capacity): Ultra high pressure waterjet cutting tool system mechanic; Water pull (compaction) operator

GROUP 9: Heavy Duty Repairman

GROUP 10: Drilling machine operator, Bucket or auger types (Calweld 200 B bucket or similar types-Watson 3000 or 5000 auger or similar types-Texoma 900 auger or similar types-drilling depth of 105' maximum); Dual drum mixer, dynamic compactor LDC350 (or similar types); Monorail locomotive operator (diesel, gas or electric); Motor patrol-blade operator (single engine); Multiple engine tractor operator (Euclid and similar type-except Quad 9 cat.); Rubber-tired earth-moving equipment operator (single

engine, over 50 yds. struck); Pneumatic pipe ramming tool and similar types; Prestressed wrapping machine operator; Rubber-tired earth-moving equipment operator (single engine, over 50 yds. struck); Rubber tired earth moving equipment operator (multiple engine, Euclid, caterpillar and similar over 25 yds. and up to 50 yds. struck), Tower crane repairman; Tractor loader operator (crawler and wheel type over 6-1/2 yds.); Woods mixer operator (and similar Pugmill equipment)

GROUP 11: Heavy Duty Repairman - Welder Combination, Welder - Certified.

GROUP 12: Auto grader operator; Automatic slip form operator; Drilling machine operator, bucket or auger types (Calweld, auger 200 CA or similar types - Watson, auger 6000 or similar types - Hughes Super Duty, auger 200 or similar types - drilling depth of 175' maximum); Hoe ram or similar with compressor; Mass excavator operator less tha 750 cu. yards; Mechanical finishing machine operator; Mobile form traveler operator; Motor patrol operator (multi-engine); Pipe mobile machine operator; Rubber-tired earth- moving equipment operator (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck); Rubber-tired self- loading scraper operator (paddle-wheel-auger type self-loading - two (2) or more units)

GROUP 13: Rubber-tired earth-moving equipment operator operating equipment with push-pull system (single engine, up to and including 25 yds. struck)

GROUP 14: Canal liner operator; Canal trimmer operator; Remote- control earth-moving equipment operator (operating a second piece of equipment: \$1.00 per hour additional); Wheel excavator operator (over 750 cu. yds.)

GROUP 15: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine-up to and including 25 yds. struck)

GROUP 16: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 17: Rubber-tired earth-moving equipment operator, operating equipment with push-pull system (multiple engine, Euclid, Caterpillar and similar, over 50 cu. yds. struck); Tandem tractor operator (operating crawler type tractors in tandem - Quad 9 and similar type)

GROUP 18: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, up to and including 25 yds. struck)

GROUP 19: Rotex concrete belt operator (or similar types); Rubber-tired earth-moving equipment operator, operating in

tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 cu. yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, up to and including 25 yds. struck)

GROUP 20: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps, and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 21: Rubber-tired earth-moving equipment operator, operating in tandem (scrapers, belly dumps and similar types in any combination, excluding compaction units - multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

GROUP 22: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, up to and including 25 yds. struck)

GROUP 23: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, Caterpillar, Euclid, Athey Wagon and similar types with any and all attachments over 25 yds. and up to and including 50 yds. struck); Rubber-tired earth-moving equipment operator, operating with the tandem push-pull system (multiple engine, up to and including 25 yds. struck)

GROUP 24: Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (single engine, over 50 yds. struck); Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar, over 25 yds. and up to 50 yds. struck)

GROUP 25: Concrete pump operator-truck mounted; Rubber-tired earth-moving equipment operator, operating equipment with the tandem push-pull system (multiple engine, Euclid, Caterpillar and similar type, over 50 cu. yds. struck)

CRANES, PILEDIVING AND HOISTING EQUIPMENT CLASSIFICATIONS

GROUP 1: Engineer oiler; Fork lift operator (includes loed, lull or similar types)

GROUP 2: Truck crane oiler

GROUP 3: A-frame or winch truck operator; Ross carrier operator (jobsite)

GROUP 4: Bridge-type unloader and turntable operator; Helicopter hoist operator

GROUP 5: Hydraulic boom truck; Stinger crane (Austin-Western or similar type); Tugger hoist operator (1 drum)

GROUP 6: Bridge crane operator; Cretor crane operator; Hoist operator (Chicago boom and similar type); Lift mobile operator; Lift slab machine operator (Vagtborg and similar types); Material hoist and/or manlift operator; Polar gantry crane operator; Self Climbing scaffold (or similar type); Shovel, backhoe, dragline, clamshell operator (over 3/4 yd. and up to 5 cu. yds. mrc); Tugger hoist operator

GROUP 7: Pedestal crane operator; Shovel, backhoe, dragline, clamshell operator (over 5 cu. yds. mrc); Tower crane repair; Tugger hoist operator (3 drum)

GROUP 8: Crane operator (up to and including 25 ton capacity); Crawler transporter operator; Derrick barge operator (up to and including 25 ton capacity); Hoist operator, stiff legs, Guy derrick or similar type (up to and including 25 ton capacity); Shovel, backhoe, dragline, clamshell operator (over 7 cu. yds., M.R.C.)

GROUP 9: Crane operator (over 25 tons and up to and including 50 tons mrc); Derrick barge operator (over 25 tons up to and including 50 tons mrc); Highline cableway operator; Hoist operator, stiff legs, Guy derrick or similar type (over 25 tons up to and including 50 tons mrc); K-crane operator; Polar crane operator; Self erecting tower crane operator maximum lifting capacity ten tons

GROUP 10: Crane operator (over 50 tons and up to and including 100 tons mrc); Derrick barge operator (over 50 tons up to and including 100 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 50 tons up to and including 100 tons mrc), Mobile tower crane operator (over 50 tons, up to and including 100 tons M.R.C.); Tower crane operator and tower gantry

GROUP 11: Crane operator (over 100 tons and up to and including 200 tons mrc); Derrick barge operator (over 100 tons up to and including 200 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 100 tons up to and including 200 tons mrc); Mobile tower crane operator (over 100 tons up to and including 200 tons mrc)

GROUP 12: Crane operator (over 200 tons up to and including 300 tons mrc); Derrick barge operator (over 200 tons up to and including 300 tons mrc); Hoist operator, stiff legs, Guy derrick or similar type (over 200 tons, up to and including 300 tons mrc); Mobile tower crane operator (over 200 tons, up to and including 300 tons mrc)

GROUP 13: Crane operator (over 300 tons); Derrick barge operator (over 300 tons); Helicopter pilot; Hoist operator, stiff legs, Guy derrick or similar type (over 300 tons); Mobile tower crane operator (over 300 tons)

TUNNEL CLASSIFICATIONS

GROUP 1: Skiploader (wheel type up to 3/4 yd. without attachment)

GROUP 2: Power-driven jumbo form setter operator

GROUP 3: Dinkey locomotive or motorperson (up to and including 10 tons)

GROUP 4: Bit sharpener; Equipment greaser (grease truck); Slip form pump operator (power-driven hydraulic lifting device for concrete forms); Tugger hoist operator (1 drum); Tunnel locomotive operator (over 10 and up to and including 30 tons)

GROUP 5: Backhoe operator (up to and including 3/4 yd.); Small Ford, Case or similar; Drill doctor; Grouting machine operator; Heading shield operator; Heavy-duty repairperson; Loader operator (Athey, Euclid, Sierra and similar types); Mucking machine operator (1/4 yd., rubber-tired, rail or track type); Pneumatic concrete placing machine operator (Hackley-Presswell or similar type); Pneumatic heading shield (tunnel); Pumpcrete gun operator; Tractor compressor drill combination operator; Tugger hoist operator (2 drum); Tunnel locomotive operator (over 30 tons)

GROUP 6: Heavy Duty Repairman

GROUP 7: Tunnel mole boring machine operator

ENGI0012-004 08/01/2008

	Rates	Fringes
POWER EQUIPMENT OPERATOR (DREDGING)		
(1) Leverman.....	\$ 43.28	16.47
(2) Dredge dozer.....	\$ 38.81	16.47
(3) Deckmate.....	\$ 38.70	16.47
(4) Winch operator (stern winch on dredge).....	\$ 38.15	16.47
(5) Fireman-Oiler, Deckhand, Bargeman, Leveehand.....	\$ 37.61	16.47
(6) Barge Mate.....	\$ 38.22	16.47

IRON0002-004 07/01/2008

	Rates	Fringes
Ironworkers:		
Fence Erector.....	\$ 25.96	14.08
Ornamental, Reinforcing and Structural.....	\$ 31.83	22.17

PREMIUM PAY:

\$6.00 additional per hour at the following locations:

China Lake Naval Test Station, Chocolate Mountains Naval Reserve-Niland,
Edwards AFB, Fort Irwin Military Station, Fort Irwin Training Center-Goldstone, San Clemente Island, San Nicholas Island,
Susanville Federal Prison, 29 Palms - Marine Corps, U.S. Marine Base - Barstow, U.S. Naval Air Facility - Seale, Vandenberg AFB

\$4.00 additional per hour at the following locations:

Army Defense Language Institute - Monterey, Fallon Air Base,
Naval Post Graduate School - Monterey, Yermo Marine Corps

Logistics Center

\$2.00 additional per hour at the following locations:

Port Hueneme, Port Mugu, U.S. Coast Guard Station - Two Rock

LABO0300-001 07/01/2008

	Rates	Fringes
Brick Tender.....	\$ 27.17	13.75

LABO0300-003 07/01/2008

	Rates	Fringes
LABORER (GUNITE)		
GROUP 1.....	\$ 29.79	16.87
GROUP 2.....	\$ 28.84	16.87
GROUP 3.....	\$ 25.30	16.87
LABORER (TUNNEL)		
GROUP 1.....	\$ 30.74	14.04
GROUP 2.....	\$ 31.06	14.04
GROUP 3.....	\$ 31.52	14.04
GROUP 4.....	\$ 32.21	14.04
LABORER		
GROUP 1.....	\$ 26.33	13.75
GROUP 2.....	\$ 26.88	13.75
GROUP 3.....	\$ 27.43	13.75
GROUP 4.....	\$ 28.98	13.75
GROUP 5.....	\$ 29.33	13.75
Laborers:		
GROUP 1.....	\$ 26.33	13.75
GROUP 2.....	\$ 26.88	13.75
GROUP 3.....	\$ 27.43	13.75
GROUP 4.....	\$ 28.98	13.75
GROUP 5.....	\$ 29.33	13.75

FOOTNOTE: GUNITE PREMIUM PAY: Workers working from a Bosn'n's Chair or suspended from a rope or cable shall receive 40 cents per hour above the foregoing applicable classification rates. Workers doing gunite and/or shotcrete work in a tunnel shall receive 35 cents per hour above the foregoing applicable classification rates, paid on a portal-to-portal basis. Any work performed on, in or above any smoke stack, silo, storage elevator or similar type of structure, when such structure is in excess of 75'-0" above base level and which work must be performed in whole or in part more than 75'-0" above base level, that work performed above the 75'-0" level shall be compensated for at 35 cents per hour above the applicable classification wage rate.

LABORER CLASSIFICATIONS

GROUP 1: Cleaning and handling of panel forms; Concrete screeding for rough strike-off; Concrete, water curing; Demolition laborer, the cleaning of brick if performed by a worker performing any other phase of demolition work, and the cleaning of lumber; Fire watcher, limber, brush loader, piler and debris handler; Flag person; Gas, oil and/or water pipeline laborer; Laborer, asphalt-rubber material loader; Laborer, general or construction; Laborer, general

clean-up; Laborer, landscaping; Laborer, jetting; Laborer, temporary water and air lines; Material hose operator (walls, slabs, floors and decks); Plugging, filling of shee bolt holes; Dry packing of concrete; Railroad maintenance, repair track person and road beds; Streetcar and railroad construction track laborers; Rigging and signaling; Scaler; Slip form raiser; Tar and mortar; Tool crib or tool house laborer; Traffic control by any method; Window cleaner; Wire mesh pulling - all concrete pouring operations

GROUP 2: Asphalt shoveler; Cement dumper (on 1 yd. or larger mixer and handling bulk cement); Cesspool digger and installer; Chucktender; Chute handler, pouring concrete, the handling of the chute from readymix trucks, such as walls, slabs, decks, floors, foundation, footings, curbs, gutters and sidewalks; Concrete curer, impervious membrane and form oiler; Cutting torch operator (demolition); Fine grader, highways and street paving, airport, runways and similar type heavy construction; Gas, oil and/or water pipeline wrapper - pot tender and form person; Guinea chaser; Headerboard person - asphalt; Laborer, packing rod steel and pans; Membrane vapor barrier installer; Power broom sweeper (small); Riprap stonepaver, placing stone or wet sacked concrete; Roto scraper and tiller; Sandblaster (pot tender); Septic tank digger and installer(lead); Tank scaler and cleaner; Tree climber, faller, chain saw operator, Pittsburgh chipper and similar type brush shredder; Underground laborer, including caisson bellower

GROUP 3: Buggymobile person; Concrete cutting torch; Concrete pile cutter; Driller, jackhammer, 2-1/2 ft. drill steel or longer; Dri-pak-it machine; Gas, oil and/or water pipeline wrapper, 6-in. pipe and over, by any method, inside and out; High scaler (including drilling of same); Hydro seeder and similar type; Impact wrench multi-plate; Kettle person, pot person and workers applying asphalt, lay-kold, creosote, lime caustic and similar type materials ("applying" means applying, dipping, brushing or handling of such materials for pipe wrapping and waterproofing); Operator of pneumatic, gas, electric tools, vibrating machine, pavement breaker, air blasting, come-alongs, and similar mechanical tools not separately classified herein; Pipelayer's backup person, coating, grouting, making of joints, sealing, caulking, diapering and including rubber gasket joints, pointing and any and all other services; Rock slinger; Rotary scarifier or multiple head concrete chipping scarifier; Steel headerboard and guideline setter; Tamper, Barko, Wacker and similar type; Trenching machine, hand-propelled

GROUP 4: Asphalt raker, lute person, ironer, asphalt dump person, and asphalt spreader boxes (all types); Concrete core cutter (walls, floors or ceilings), grinder or sander; Concrete saw person, cutting walls or flat work, scoring old or new concrete; Cribber, shorer, lagging, sheeting and trench bracing, hand-guided lagging hammer; Head rock slinger; Laborer, asphalt- rubber distributor boot person; Laser beam in connection with laborers' work; Oversize concrete vibrator operator, 70 lbs. and over; Pipelayer performing all services in the laying and installation of pipe from the point of receiving pipe in the ditch until completion of operation, including any and all forms of tubular material, whether pipe, metallic or non-metallic, conduit and any other stationary type of tubular device

used for the conveying of any substance or element, whether water, sewage, solid gas, air, or other product whatsoever and without regard to the nature of material from which the tubular material is fabricated; No-joint pipe and stripping of same; Prefabricated manhole installer; Sandblaster (nozzle person), water blasting, Porta Shot-Blast

GROUP 5: Blaster powder, all work of loading holes, placing and blasting of all powder and explosives of whatever type, regardless of method used for such loading and placing; Driller: All power drills, excluding jackhammer, whether core, diamond, wagon, track, multiple unit, and any and all other types of mechanical drills without regard to the form of motive power; Toxic waste removal

TUNNEL LABORER CLASSIFICATIONS

GROUP 1: Batch plant laborer; Bull gang mucker, track person; Changehouse person; Concrete crew, including rodger and spreader; Dump person; Dump person (outside); Swamper (brake person and switch person on tunnel work); Tunnel materials handling person

GROUP 2: Chucktender, cabletender; Loading and unloading agitator cars; Nipper; Pot tender, using mastic or other materials (for example, but not by way of limitation, shotcrete, etc.); Vibrator person, jack hammer, pneumatic tools (except driller)

GROUP 3: Blaster, driller, powder person; Chemical grout jet person; Cherry picker person; Grout gun person; Grout mixer person; Grout pump person; Jackleg miner; Jumbo person; Kemper and other pneumatic concrete placer operator; Miner, tunnel (hand or machine); Nozzle person; Operating of troweling and/or grouting machines; Powder person (primer house); Primer person; Sandblaster; Shotcrete person; Steel form raiser and setter; Timber person, retimber person, wood or steel; Tunnel Concrete finisher

GROUP 4: Diamond driller; Sandblaster; Shaft and raise work

GUNITE LABORER CLASSIFICATIONS

GROUP 1: Rodmen, Nozzlemen

GROUP 2: Gunmen

GROUP 3: Reboundmen

LABO0300-008 08/06/2008

	Rates	Fringes
LABORER		
PLASTER CLEAN-UP LABORER....	\$ 26.65	13.70
PLASTER TENDER.....	\$ 29.20	13.70

Work at Military Bases - \$3.00 additional per hour:

Coronado Naval Amphibious Base, Fort Irwin, George AFB,
Marine Corps Air Station-29 Palms, Imperial Beach Naval Air
Station, Marine Corps Logistics Supply Base, Marine Corps
Pickle Meadows, Mountain Warfare Training Center, Naval
Air Facility-Seeley, North Island Naval Air Station,

Vandenberg AFB.

LABO0882-002 01/01/2009

	Rates	Fringes
Asbestos Removal Laborer.....	\$ 26.15	13.25

SCOPE OF WORK: Includes site mobilization, initial site cleanup, site preparation, removal of asbestos-containing material and toxic waste, encapsulation, enclosure and disposal of asbestos- containing materials and toxic waste by hand or with equipment or machinery; scaffolding, fabrication of temporary wooden barriers and assembly of decontamination stations.

LABO1184-001 07/01/2008

	Rates	Fringes
Laborers: (HORIZONTAL		
DIRECTIONAL DRILLING)		
(1) Drilling Crew Laborer...	\$ 27.05	9.40
(2) Vehicle Operator/Hauler.	\$ 27.22	9.40
(3) Horizontal Directional		
Drill Operator.....	\$ 29.07	9.40
(4) Electronic Tracking		
Locator.....	\$ 31.07	9.40
Laborers: (STRIPING/SLURRY		
SEAL)		
GROUP 1.....	\$ 27.75	12.06
GROUP 2.....	\$ 29.05	12.06
GROUP 3.....	\$ 31.06	12.06
GROUP 4.....	\$ 32.80	12.06

LABORERS - STRIPING CLASSIFICATIONS

GROUP 1: Protective coating, pavement sealing, including repair and filling of cracks by any method on any surface in parking lots, game courts and playgrounds; carstops; operation of all related machinery and equipment; equipment repair technician

GROUP 2: Traffic surface abrasive blaster; pot tender - removal of all traffic lines and markings by any method (sandblasting, waterblasting, grinding, etc.) and preparation of surface for coatings. Traffic control person: controlling and directing traffic through both conventional and moving lane closures; operation of all related machinery and equipment

GROUP 3: Traffic delineating device applicator: Layout and application of pavement markers, delineating signs, rumble and traffic bars, adhesives, guide markers, other traffic delineating devices including traffic control. This category includes all traffic related surface preparation (sandblasting, waterblasting, grinding) as part of the application process. Traffic protective delineating system installer: removes, relocates, installs, permanently affixed roadside and parking delineation barricades, fencing, cable anchor, guard rail, reference signs, monument markers; operation of all related machinery and equipment; power broom sweeper

GROUP 4: Striper: layout and application of traffic stripes and markings; hot thermo plastic; tape traffic stripes and markings, including traffic control; operation of all related machinery and equipment

PAIN0036-001 07/01/2008

	Rates	Fringes
Painters: (Including Lead Abatement)		
(1) Repaint.....	\$ 26.05	8.54
(2) All Other Work.....	\$ 29.32	8.54

REPAINT of any structure with the exception of work involving the aerospace industry, breweries, commercial recreational facilities, hotels which operate commercial establishments as part of hotel service, and sports facilities, tenant improvement work not included in conjunction with the construction of the building and all repainting of tenant improvement projects.

PAIN0036-008 10/01/2008

	Rates	Fringes
DRYWALL FINISHER/TAPER.....	\$ 31.64	11.29

PAIN0036-015 01/01/2009

	Rates	Fringes
GLAZIER.....	\$ 35.30	16.42

FOOTNOTE: Additional \$1.25 per hour for work in a condor, from the third (3rd) floor and up Additional \$1.25 per hour for work on the outside of the building from a swing stage or any suspended contrivance, from the ground up

* PAIN1247-002 05/01/2009

	Rates	Fringes
SOFT FLOOR LAYER.....	\$ 30.85	9.54

PLAS0200-008 08/06/2008

	Rates	Fringes
PLASTERER.....	\$ 34.66	8.63

FORT IRWIN; GEORGE AIR FORCE BASE; MARINE CORPS AIR STATION 29 PALMS, AND MARINE CORPS LOGISTICS SUPPLY BASE: \$3.00 additional per hour.

PLAS0500-002 07/01/2007

	Rates	Fringes
CEMENT MASON/CONCRETE FINISHER...	\$ 28.00	16.45

PLUM0016-002 07/01/2008

Rates	Fringes
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PLUMBER, PIPEFITTER,
STEAMFITTER

(1) Work on strip malls, light commercial, tenant improvement and remodel work.....	\$ 28.16	13.64
(2) Work on new additions and remodeling of bars, restaurants, stores and commercial buildings, not to exceed 5,000 sq. ft. of floor space.....	\$ 35.17	15.03
(3) All other work.....	\$ 36.27	16.01
(4) Work at Edwards AFB and George AFB.....	\$ 40.77	16.01
(5) Work at Fort Irwin Army Base, Marine Corps Logistic Base at Nebo, Marine Corps Logistic Base at Yermo and Twenty-Nine Palms Marine Base.....	\$ 43.27	16.01

PLUM0345-001 07/01/2008

	Rates	Fringes
PLUMBER		
Landscape/Irrigation Fitter..	\$ 25.98	13.01
Sewer & Storm Drain Work....	\$ 24.62	14.84

ROOF0036-002 08/01/2008

	Rates	Fringes
ROOFER.....	\$ 31.65	7.87

FOOTNOTE: Pitch premium: Work on which employees are exposed to pitch fumes or required to handle pitch, pitch base or pitch impregnated products, or any material containing coal tar pitch, the entire roofing crew shall receive \$1.75 per hour "pitch premium" pay.

SFCA0669-009 01/01/2009

Does not include the northern part of the City of Chino, or the Cities of Montclair and Ontario

	Rates	Fringes
SPRINKLER FITTER.....	\$ 32.85	16.05

SFCA0709-004 01/01/2009

THE NORTHERN PART OF THE CITY OF CHINO, AND THE CITIES OF MONTCLAIR AND ONTARIO:

	Rates	Fringes
SPRINKLER FITTER (Fire).....	\$ 38.08	19.75

SHEE0105-003 01/01/2009

LOS ANGELES (South of a straight line drawn between Gorman and

Big Pines) and Catalina Island, INYO, KERN (Northeast part, East of Hwy 395), MONO ORANGE, RIVERSIDE, AND SAN BERNARDINO COUNTIES

Rates

Fringes

SHEET METAL WORKER

(1) Commercial - New Construction and Remodel work.....	\$ 38.57	16.19
(2) Industrial work including air pollution control systems, noise abatement, hand rails, guard rails, excluding aritechtrual sheet metal work, excluding A-C, heating, ventilating systems for human comfort...	\$ 33.22	21.74

TEAM0011-002 07/01/2008

Rates

Fringes

TRUCK DRIVER

GROUP 1.....	\$ 26.44	18.24
GROUP 2.....	\$ 26.59	18.24
GROUP 3.....	\$ 26.72	18.24
GROUP 4.....	\$ 26.91	18.24
GROUP 5.....	\$ 26.94	18.24
GROUP 6.....	\$ 26.97	18.24
GROUP 7.....	\$ 27.22	18.24
GROUP 8.....	\$ 27.47	18.24
GROUP 9.....	\$ 27.67	18.24
GROUP 10.....	\$ 27.97	18.24
GROUP 11.....	\$ 28.47	18.24
GROUP 12.....	\$ 28.90	18.24

WORK ON ALL MILITARY BASES:

PREMIUM PAY: \$3.00 per hour additional.

[29 palms Marine Base, Camp Roberts, China Lake, Edwards AFB, El Centro Naval Facility, Fort Irwin, George AFB, Marine Corps Logistics Base at Nebo & Yermo, Mountain Warfare Training Center, Bridgeport, Point Arguello, Point Conception, Vandenberg AFB]

TRUCK DRIVERS CLASSIFICATIONS

GROUP 1: Truck driver

GROUP 2: Driver of vehicle or combination of vehicles - 2 axles; Traffic control pilot car excluding moving heavy equipment permit load; Truck mounted broom

GROUP 3: Driver of vehicle or combination of vehicles - 3 axles; Boot person; Cement mason distribution truck; Fuel truck driver; Water truck - 2 axle; Dump truck, less than 16 yds. water level; Erosion control driver

GROUP 4: Driver of transit mix truck, under 3 yds.; Dumpcrete truck, less than 6-1/2 yds. water level

GROUP 5: Water truck, 3 or more axles; Truck greaser and tire person (\$0.50 additional for tire person); Pipeline and utility working truck driver, including winch truck and

plastic fusion, limited to pipeline and utility work;
Slurry truck driver

GROUP 6: Transit mix truck, 3 yds. or more; Dumpcrete truck, 6-1/2 yds. water level and over; Vehicle or combination of vehicles - 4 or more axles; Oil spreader truck; Dump truck, 16 yds. to 25 yds. water level

GROUP 7: A Frame, Swedish crane or similar; Forklift driver; Ross carrier driver

GROUP 8: Dump truck, 25 yds. to 49 yds. water level; Truck repair person; Water pull - single engine; Welder

GROUP 9: Truck repair person/welder; Low bed driver, 9 axles or over

GROUP 10: Dump truck - 50 yds. or more water level; Water pull - single engine with attachment

GROUP 11: Water pull - twin engine; Water pull - twin engine with attachments; Winch truck driver - \$1.25 additional when operating winch or similar special attachments

GROUP 12: Boom Truck 17K and above

WELDERS - Receive rate prescribed for craft performing operation to which welding is incidental.
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Unlisted classifications needed for work not included within the scope of the classifications listed may be added after award only as provided in the labor standards contract clauses (29CFR 5.5 (a) (1) (ii)).

In the listing above, the "SU" designation means that rates listed under the identifier do not reflect collectively bargained wage and fringe benefit rates. Other designations indicate unions whose rates have been determined to be prevailing.

WAGE DETERMINATION APPEALS PROCESS

1.) Has there been an initial decision in the matter? This can be:

- * an existing published wage determination
- * a survey underlying a wage determination
- * a Wage and Hour Division letter setting forth a position on a wage determination matter
- * a conformance (additional classification and rate) ruling

On survey related matters, initial contact, including requests for summaries of surveys, should be with the Wage and Hour Regional Office for the area in which the survey was conducted because those Regional Offices have responsibility for the Davis-Bacon survey program. If the response from this initial contact is not satisfactory, then the process described in 2.) and 3.) should be followed.

With regard to any other matter not yet ripe for the formal process described here, initial contact should be with the Branch of Construction Wage Determinations. Write to:

Branch of Construction Wage Determinations
Wage and Hour Division
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

2.) If the answer to the question in 1.) is yes, then an interested party (those affected by the action) can request review and reconsideration from the Wage and Hour Administrator (See 29 CFR Part 1.8 and 29 CFR Part 7). Write to:

Wage and Hour Administrator
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

The request should be accompanied by a full statement of the interested party's position and by any information (wage payment data, project description, area practice material, etc.) that the requestor considers relevant to the issue.

3.) If the decision of the Administrator is not favorable, an interested party may appeal directly to the Administrative Review Board (formerly the Wage Appeals Board). Write to:

Administrative Review Board
U.S. Department of Labor
200 Constitution Avenue, N.W.
Washington, DC 20210

4.) All decisions by the Administrative Review Board are final.

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END OF GENERAL DECISION